1-15 JANUARY, 2023

Down To Earth

30 years

FORTNIGHTLY ON POLITICS OF DEVELOPMENT, ENVIRONMENT AND HEALTH

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MAGAZINE KING

THREATS WE WEAVE

A majority of the world's clothes use plastic fibres like polyester. Yet plastic pollution norms do not apply on the textile sector

LEAD TOXICITY

Half the children in India poisoned by the heavy metal P18

15TH CONVENTION ON BIODIVERSITY

Can Montreal framework save the world from ecological collapse? P24

VISIT…

MAGAZINE KING

ILLUSTRATION: YOGENDRA ANAND / CSE

Anil Agarwal (1947-2002)

INDIA NEEDS A GOBAR MINISTER

A few years ago, social activist Pramila Dandavate had asked me at the end of a talk whether the Indian environmental movement had a symbol similar to (Mahatma) Gandhiji's *charkha* (spinning wheel) during the freedom struggle. My answer was, of course, no, as indeed there is none.

But I have since thought a lot about this. My first response was to say that the bicycle is the best symbol. It is good from an environmental point of view, being a non-polluting vehicle. It is good from a social point of view. Only a transport system built around the bicycle would promote equity. The bicycle also keeps the rider fit and healthy. So from all points of view it is a great symbol—except that it is not a product of Indian culture, like the *charkha*.

After a lot of thought, I now believe that gobar (cow dung) is the answer. The widespread and diverse use of gobar in Indian society stands up to every principle of good environmentalism. Cow dung is a waste product. Yet, instead of being looked

down upon, it is highly respected. People touch it without hesitation. They even use this waste to plaster their mud houses to keep away, of all things, houseflies.

I have often wondered what prompted someone to use animal waste in such an imaginative manner, since the obvious reaction is to stay away from it. But someone must have watched cow dung with great interest and noticed that it had certain qualities worth experimenting with.

This person was probably a woman, given the fact that women spend so much time taking care of cattle. She was obviously a person inspired instinctively by the best principles of recycling. Cattle exist in plenty and so do cow dung. Can I make some use of it? Of course, the greatest use of cow dung is in our farming systems. Indian soils have been exploited for millennia. Yet today they continue to be fecund. To a great extent this is because Indians have practised not just farming but a combination of farming and animal care which give them access to large quantities of animal manure. The use of cow dung in the villages of the Western Himalaya is absolutely remarkable even today. The soils of the mountain terraces are inherently poor. But they have to be cultivated year after year. They remain fertile only because the villagers keep a lot of cattle, more for cow dung than milk, spend hours going to the forest to collect leaves and grasses to feed them, then collect hundreds of tonnes of cow dung from cattle sheds and carry it to the fields to manure them.

All those pictures of women carrying loads of firewood have been described as symbolic of an energy crisis. But this is a total misunderstanding of the real situation. Every Himalayan woman has tonnes of cow dung at home which she can potentially use as fuel. But she will never do so. She will instead spend hours going to the forest to collect firewood but keep every dung dropping for her fields. Unfortunately, women in many other parts of India have no forest to turn to. They can only burn cow dung. As a result, millions of tonnes get burnt every year as cooking fuel. For Bharat, cow dung is more important than electricity, coal or petroleum.

Years ago, while addressing the Parliamentary Consultative Committee of the Ministry of Energy, minister Sushila Rohatgi asked me what I thought was wrong with India's energy policy. Its management, I answered. The least important energy source, atomic energy, is looked after by the most important minister, namely, the prime minister. Next in order of importance are electricity, coal and petroleum. All have separate departments and ministers. But the most important energy sources, firewood, cow dung and agricultural residues, have none. So, I explained to Sushilaji, India's energy system needs a Gobar Mantri (cow-dung minister). I had no hesitation in saying this especially after having shown the Members of Parliament slides of how people in Gujarat and Rajasthan put a stone or a stick on every cowpat lying on common lands to lay private claim on it. I, therefore, can't think of an example which symbolises the spirit of environmentalism more than gobar.

The least important energy source, atomic energy, is looked after by the most important minister, the prime minister. But the most important energy sources, firewood, cow dung and agricultural residues, have none

MAGAZINE KING

Do you agree with me that a cow dung mound best symbolises India's environmentalism, or have I got my head too much in dung? DTE @down2earthindia

(Anil Agarwal was the founder of Centre for Science and Environment and Down To Earth, and wrote this editorial for the 16-31 August, 1995 edition of the magazine)

30 years
Down To Earth

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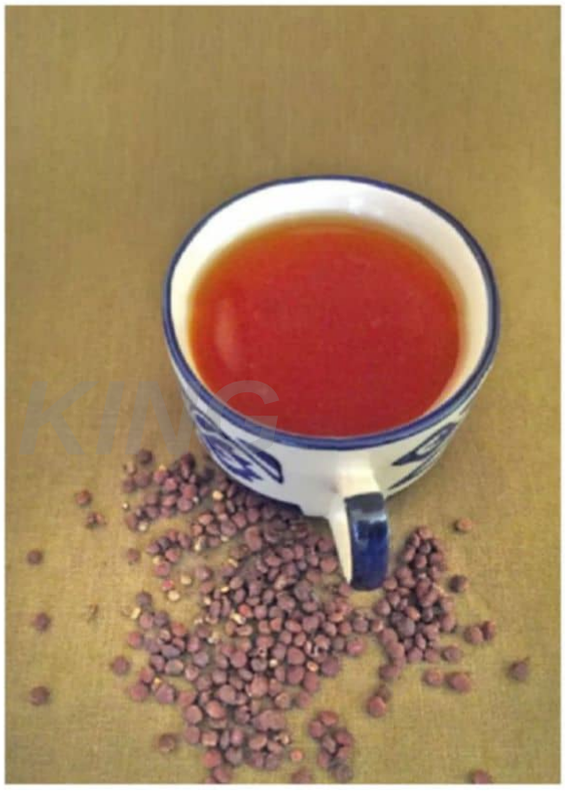

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Engage

PHOTOGRAPH: VIKAS CHOUDHARY / CSE

GM mustard will not benefit the country

This refers to the cover story "Why GM mustard" (16-30 November, 2022). Growing of genetically modified (GM) mustard crop in India is unnecessary for the following reasons.

First, many countries have banned the import of crop produce from GM cultivars, and several are likely to follow suit. India's agricultural export trade lies in GM-free cropping. Farmers themselves say that they have many high-yielding non-GM mustard varieties to grow.

Second, in terms of edible oil, it is accepted that consumption of locally produced edible oil is the most suitable for health, particularly, cardiac health. The country has a plethora of edible oils available, each specific to a region. For instance, people in Tamil Nadu do not cook with mustard oil, while those in West Bengal will not use gingelly oil. Hence, boosting production of just one type of oil across the country will not be beneficial. Self sufficiency in edible oils has to be determined on the basis of use, production, imports and exports.

S VENKATARAMAN
VIA EMAIL

Make producers manage their plastic

According to some reports, more than 5 million tonnes of plastic enter India's soil and oceans every year. The good news is that there are ways to solve this massive pollution problem, by reforming the way people produce, use, recycle and reuse plastic and its materials. To start with, the country must implement extended producer responsibility, which makes corporations who introduce plastics and its packaging products into the ecosystem financially responsible for its collection, sorting, recycling and reuse. By mandating producers to fund and manage the plastic lifecycle, the government can remove the financial burden imposed on taxpayers and shift focus to protecting the communities and natural spaces. Moreover, this will help hold producers to higher standards to ensure that they are using recycled content and removing polluting materials from the ecosystem. Each state can initiate its own measures to implement extended producer responsibility and individuals can also be involved in the entire process.

Another way to promote the reuse and recycling of plastic would be to declare a specific "plastic recyclers day" every year. These efforts, if managed successfully, can together help enhance plastic recycling while incentivising producers to do more with less. By implementing extended producer responsibility, the government can be one step closer to ensuring that plastic stays out of the natural environment and the ecosystem.

VIJAYKUMAR H K
RAICHUR

MAGAZINE KING

Awareness on net-zero technologies

This refers to "Net Zero by 2050 will hit a major timing problem technology can't solve. We need to talk about cutting consumption" published online on April 28, 2022. The article was quite informative; right now, the global energy revolution is in progress. The article mentions some of the new technologies that can help India reach its net-zero emissions target, along with some other innovations available in the market.

TDI PUSHPRAJ
VIA EMAIL

Down To Earth welcomes comments and suggestions from readers in response to its articles and opinion pieces. We are introducing a "Pick of the Postbag" award, under which the letter adjudged the best will be highlighted and the winner will receive a free one-year digital subscription of the magazine. Letters may be e-mailed to *editor@downtoearth.org.in* or sent to: The Society for Environmental Communications; 41, Tughlakabad Institutional Area; New Delhi-110 062. Letter writers should mention their full name, postal address and phone number.

DTE TV

India's first bio-CNG plant that fuels Indore's buses

Bio-Compressed Natural Gas (CNG) technology has a threefold benefit in the fight

against air pollution—it can curtail methane emissions, reduce burning of waste and help phase out fossil-fuel powered vehicles. But in India, the market for bio-CNG has not managed to reach a larger scale, To understand why, let's visit the country's first bio-CNG plant in India's cleanest city, Indore, and learn the challenges it faces. Watch the video to find out more.

FOR MORE VIDEOS, SCAN

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MAGAZINE KING

Digest

WHAT'S INSIDE

A bid to promote farming in Uttarakhand villages **P12** / Global vaccination drive COVAX nearing end **P13** / A new method kindles hope to save coral reefs **P14**

1,000 WORDS VIKAS CHOUDHARY

A farmer looks for fish in the standing waters of a harvested paddy field in Loyonkel village, Khunti district, Jharkhand. Paddy, maize, pulses and oilseeds are the main kharif crops in the state. In 2022, crops were sown in only 1.4 million hectares or half the targeted area, due to inadequate rainfall. The state government declared drought in 22 of the 24 districts in October, and announced a relief amount of ₹3,500 each for 3 million affected farmers. When *Down To Earth* visited the state in December, most of the applicants were still waiting for compensation, which was delayed due to technical glitches.

FOR MORE PHOTOS, SCAN

Foster farmer

Sudhir Kumar Sundriyal helps people in Uttarakhand's Pauri district earn livelihoods in villages to prevent distress migration

RAJU SAJWAN

TWICE A year, Sudhir Kumar Sundriyal collects all the crops grown on his land in Dabra village and sorts them into two batches. The first batch consists of fruits and vegetables, pulses, wheat and paddy for him and his wife, Hemalatha, to use at home. The second batch comprises of crops such as apple, lemon, walnut and cardamom, along with seeds and saplings worth ₹1.5-2 lakh, to be distributed for free to farmers in Dabra and other nearby villages in Uttarakhand's hilly Pauri district.

While distributing his produce and saplings to the more than 100 farmers, who are part of his Feel Good Agro Developers group, Sundriyal also shares some tips on growing the produce further for their own benefit. If the crop grows well and people earn good incomes, they will not have to leave their homes in search of work, he says.

Sundriyal established this model of growing and distributing crops eight years ago, after returning to his ancestral house in Dabra village. Like several people from rural areas, he had moved in search of income to the National Capital Region, where he worked in a media organisation for two decades. "I used to miss the village. I was worried about my crumbling ancestral house and barren fields. I realised that if work was available in the villages, people would not have to leave," he says.

Hence, in 2014, Sundriyal went to some agricultural institutes in Uttarakhand to learn about suitable farming and horticulture. This helped him see some success in his farm at Dabra. "We grow so much that we do not see any dearth in food," says Sundriyal. Other people in the area began to approach him to learn his techniques. "Pauri is a mountainous region with uneven terrain. Tractors and big machines cannot be used here and terrace farming is not convenient. Hence I advised people on farming in this terrain, and asked them to attempt gardening as well," he says. To encourage more people to try cultivation, Sundriyal established Feel Good Charitable Trust in January 2015, through which he distributes saplings and plants and helps farmers borrow small equipment through a machinery bank. For this, he gets financial support from two non-profits, Uttaranchal Association of North America and Save Indian Farmers.

"Four years ago, Sundriyal gave me 300 lemons for sowing. Of them, about 100 plants are producing fruit. This year, I have seen 20-25 kg fruit; next year I hope to get greater yield. If more farmers are inspired, I am sure they will stop leaving villages," says Shailesh Pokhriyal, a farmer from Gehunlad village in Pauri district.

Feel Good has also undertaken other initiatives. Irrigation is a major concern, and so the non-profit has built reservoirs in the district and farmers are conducting water conservation campaigns. Further, Sundriyal and Hemalatha helps raise funds for 60 children's education in Pauri district. "These campaigns are proving to be effective in convincing people to stay in the region and build their lives here," he says.

MAGAZINE KING

COVID-19

Global vaccination drive nears end

ON DECEMBER 8, the COVID-19 Vaccines Global Access (COVAX), a global initiative for access to immunisation against COVID-19, lost a key partner when GAVI, The Vaccine Alliance decided to phase out support under the initiative to 37 low- and middle-income nations after 2023.

GAVI, a public-private partnership that aims to increase immunisation in poor countries, will continue to provide free vaccines and funds to deliver them to 54 other developing nations under COVAX till 2025, if they want such support. The alliance's decision came on the back of reports that demand for COVID-19 vaccines has plummeted worldwide. GAVI now says it will shift focus to regain progress in routine child immunisation programmes that derailed during the pandemic.

Latest data, however, shows that developing countries still do not see great progress in COVID-19 immunisation. As on December 21, while 68.7 per cent of the world has received at least one dose, only 25.1 per cent people in low-income countries have done the same, as per online repository *Our World In Data*.

Further, in wake of the recent COVID-19 waves in China, there are growing concerns of new variants which may necessitate vaccine campaigns. On December 21, in an address regarding the surge in China, VK Paul of India's national taskforce on COVID-19 urged people to take precautions and increase booster uptake.

MAGAZINE KING

ENERGY

Race to tap into Africa's renewable resources

ON DECEMBER 13-15, US President Joseph Biden hosted leaders from across Africa in a trade summit to discuss agreements on climate change, finance and health. At the summit, Power Africa, a US government-led initiative, and the US International Development Finance Corporation also pledged investment deals to help the African continent move away from coal-based power. The deals will connect US companies with African cities to build renewable energy infrastructure. Ahead of the summit media reports and analysts said that the US' increased interest in Africa is a bid to catch up to China's stronghold in the continent, which includes a plethora of investments in African countries' renewable energy resources. The race to invest in Africa's energy sector also comes as EU countries, reeling from a power crunch due to the Russia-Ukraine conflict, have been tapping into African coal and fossil fuel resources.

AGRICULTURE

Farmers take to roads over financial woes

THE THIRD week of December saw several farmer groups across India stage demonstrations. On December 19, Bhartiya Kisan Sangh, a farmer group affiliated to the Rashtriya Swayamsevak Sangh, held a huge rally in the national capital to demand remunerative prices for farmers' crops along with withdrawal of permission to genetically modified crops and removal of GST (goods and services tax) on agricultural inputs. A day later, in Rajasthan's Alwar district during a political rally held by Congress, farmers held a demonstration alleging that the state government did not fulfill its promise of loan waiver. Meanwhile, sugarcane farmers in two states have also been protesting. In Thanjavur, Tamil Nadu, farmers are demanding payment of dues amounting to more than ₹85 crore, pending since 2018 when a mill in the district shut down. In Karnal, Haryana, farmers led by Bhartiya Kisan Union seek a hike in the state advised price for sugarcane.

QUERY

Freezing coral to save reefs

1 Which coral has been frozen?
Scientists in Australia have successfully tried a new method to freeze and store coral larvae from the Great Barrier Reef. This larvae could potentially be used in the future to rewild the dying reef.

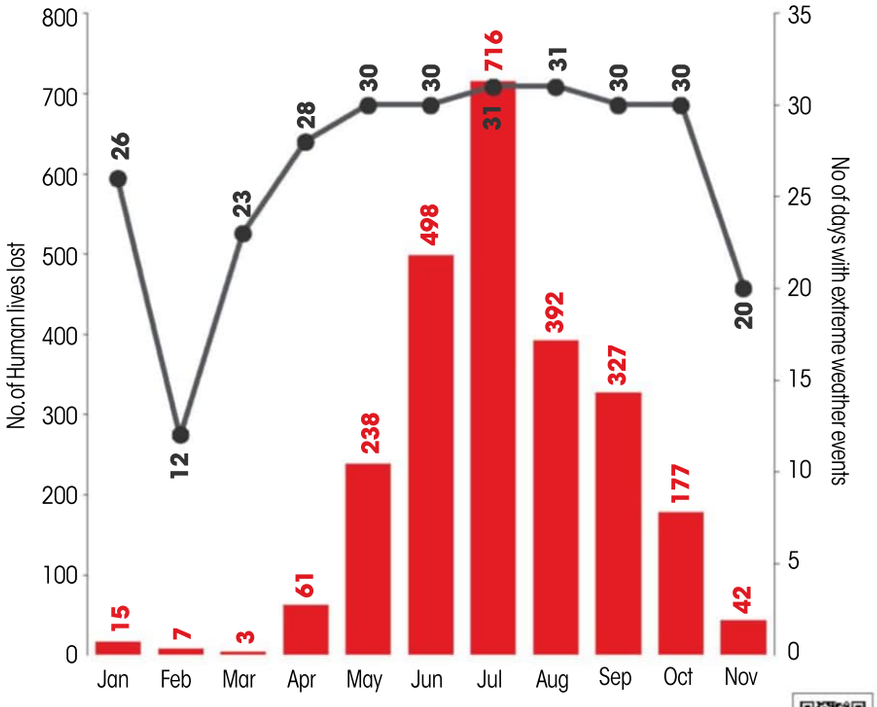
2 How does the new method work?
Freezing of materials, including food and living beings, for a long period is called cryonics or cryogenics. It was already known that coral can be cryogenically frozen and stored, but earlier methods involved equipment such as lasers and were too expensive to be used on a large scale. In Australia, the method used now involves cryomesh, is a specially-designed material used to help preserve the object to be frozen. This cryomesh is lightweight and can be produced at a low cost, storing the coral at -196°C.

3 Can this method be scaled up quickly?
While the scientists are optimistic, the cryomesh already failed once in a trial conducted on a large variety of Hawaiian corals. More research will be need to gauge the scale of this method.

MAGAZINE KING

TRACKER

India experienced extreme weather events on **291 of the 334 days** from January 1 to November 30, 2022, which claimed **3,006 lives**. The events counted here include lightning and storms; heavy rains, floods and landslides; heatwaves; cold days and coldwaves; snowfall; cloudbursts; and cyclones



Source: India's Atlas on Weather Disasters by *Down to Earth* data centre

Scan this QR code to see *Down To Earth*'s analysis of extreme weather events

BITS GLOBAL

The EU on December 18 agreed to a new deal which says that by 2030, member-states will cut emissions by 62 per cent from 2005 levels, as against the earlier target of 43 per cent. The new plan involves phasing out carbon dioxide permits that the bloc currently gives industries to protect them from foreign competition, and bringing in a carbon border tax for importers by 2033. As of the end of December, the provisional deal was yet to be formally adopted by the European Parliament and the European Council.

The Arctic region is getting rainier and seeing a shift in seasons, making roads icy and cutting off food access to animals in the region, according to the annual Arctic Report Card. Released on December 13 by almost 150 Arctic scientists globally, the analysis says the reason for this precipitation is rapid loss of sea-ice in the Arctic and increased moisture in the atmosphere due to warmer weather.

Physicists in the US claimed on December 13 that they made a major breakthrough in nuclear fusion research, by producing more energy in an experiment than was put in. This puts the world closer to attempting nuclear fusion, a process in which light atoms are combined to release energy with only small amounts of radioactive waste , to meet countries' power requirements. However, more research is needed to scale up the results.

British auction house Sotheby's on December 11 delayed a plan to auction licence rights to a 100-island archipelago in Indonesia. The auction of the Widi Reserve, scheduled for December 8-14, will now take place in January. The listing of the islands, coordinated by PT Leadership Islands Indonesia, the company responsible for their management, evokes environmental concerns as the archipelago is home to several endangered species.

BITS INDIA

As many as 39 amendments were made to various rules and notifications to the Environment Protection Act, 1986 from March 2020 to March 2022, according to a December report by Delhi-based independent legal research think tank Vidhi. A majority of the amendments were to the rules and norms for environmental clearances. Some of the amendments undermine environmental protection measures and are outside the scope of the law, says the think tank.

The Indian Academy of Paediatrics has suggested addition of five vaccines—for typhoid, chickenpox, hepatitis A, influenza and Japanese encephalitis—to the Centre's immunisation schedule for children on December 18. The body also released its first set of treatment protocols for some of the most common childhood illnesses, with an aim to improve records of children's immunisation and monitor prescription of antibiotics for diseases.

Residents from around 40 villages of Jaisalmer walked 225 km to submit a letter to the district collector on December 19, asking the authorities to re-categorise community-run "orans". These spaces are rich in biodiversity and the last natural habitat of the great Indian bustard, a critically endangered bird species, as per the International Union for Conservation of Nature. Currently, orans are classified as wastelands and marked for excessive development, putting biodiversity at risk.

Flooded area in Tamil Nadu will increase from 12.6 per cent to 26.4 per cent by the 2080s, according to projections made by the state government based on global climate models. In a report released in mid-December, the government says the state will be adversely affected by warmer conditions by the last quarter of the century, making the environment hostile and likely increasing occurrences of heatwaves and health hazards.

FRAMEWORKS

■The **Net Zero Emissions Bill, 2022** was introduced in Rajya Sabha during the Winter session of the Parliament. The bill aims to provide a framework for achieving net zero emissions by the year 2070 as per India's nationally determined contributions under the UN Framework Convention on Climate Change

■The **Mahatma Gandhi National Rural Employment Guarantee (Amendment) Bill, 2022** was introduced in Rajya Sabha during the Winter session. The amendment seeks to guarantee 200 days of wage employment each to at least two adult members of a household in rural areas.

■The Haryana government has published the **Vehicle Scrappage Policy, 2022**. Effective for five years from December 2022, the policy aims to phase out old vehicles unfit for the environment by measures such as imposing higher registration fees and introducing scrapping facilities.

IN COURT

NATIONAL GREEN TRIBUNAL

■ Hearing a case on pollution of the Sundarbans waters due to capsizing of barges carrying fly ash, the National Green Tribunal (NGT) asked the Central Pollution Control Board to determine compensation to be levied on those responsible for the damage.

■ In a matter related to violation of various environmental norms by three sand mining companies in Yamuna Nagar district, Haryana, NGT has directed the firms to pay a compensation of a total of ₹19 crore to the state pollution control board.

■ NGT directed constitution of a committee to look into reports that constructions under the Siddharth Vihar Yojana in Ghaziabad lack a green belt and sewage treatment plants. The Siddharth Vihar Yojana, a project by the Awas Vikas Parishad, facilitates construction of residential and other buildings.

SUPREME COURT

■ Hearing a public interest petition which demands that medicines for treatment of rare diseases be exempted from taxes and duties, the Supreme Court said that such policy decisions need to be made by the Union government, not the court.

■ In a case on the conflict between Karnataka and Tamil Nadu over the sharing of the water of the Pennaiyar river, the Supreme Court ordered the Centre to constitute a disputes tribunal to address the issue within three months (first quarter of 2023).

HIGH COURT

■ Hearing a petition filed by some housing societies in Pune suburbs alleging poor and irregular water availability, the Maharashtra high court warned the city's municipal corporation of punitive action if the supply issues are not addressed soon.

So far...

Number of cases on environment and development tracked from January 1 to December 19, 2022

NATIONAL GREEN TRIBUNAL	SUPREME COURT	HIGH COURTS
426	107	165

FOR DETAILED VERDICTS, SCAN

MAGAZINE KING

CROSS HAIRS

SORIT GUPTO

MAGAZINE KING

BIG NUMBER

50 million

birds were culled in European countries due to the highly pathogenic avian influenza epidemic between October 2021 and September 2022. Europe was the worst affected by the ongoing spread of the virus, recording **2,520 outbreaks** during the period

Source: "Avian influenza overview September-December 2022", European Food Safety Authority

VERBATIM

"THE GLOBAL EMISSIONS GAP IS GROWING. THE 1.5-DEGREE GOAL IS GASPING FOR BREATH"

ANTONIO GUTERRES

The UN Secretary-General, in his end-of-year address, noted that climate action is moving in the wrong direction. He announced that the UN will convene a "no nonsense" Climate Ambition Summit in 2023 to accelerate measures to address global warming.

By Snigdha Das, Aditya Misra, Rajit Sengupta, Sanjit Kumar, Susan Chacko, KM Sheeja and Dakshiani Palicha

SINCE 1930

Targeting Energy Consumption Through Sustainable Energy Resources

Himalaya Wellness Company creates products backed by nature and science, conscious of the well-being of our planet. We understand that sustainable business practices promote the Earth's long-term well-being.

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MAGAZINE KING

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We remain committed to driving a strong sustainable living.

*For every ton of wastepaper recycled, 22 trees are saved.

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NURTURING WELLNESS, SUSTAINING NATURE

Element of mystery

Half the children in India are poisoned by lead. Why has the country failed to prevent it despite knowing the sources and treatment?

TARAN DEOL DELHI

ILLUSTRATION: YOGENDRA ANAND / CSE

FOR MONTHS before his second birthday in 2007, Vijay Singh (name changed) had frequent bouts of uncontrolled vomiting three-four times a day. He had turned pale and weak. For almost a year, Vijay's parents, residents of Barabanki town in Uttar Pradesh, took him to several medical centres. Finally, a doctor at the district hospital in Faizabad, 100 km away from Barabanki, realised Vijay was severely anaemic and began blood transfusions. Even so, his haemoglobin levels remained dangerously low.

His parents then went to a super-speciality hospital in Lucknow, where doctors conducted several tests like bone marrow analysis and genetic profiling. The mystery prevailed until Vijay's father, Manjit, revealed his source of income—a battery recycling operation at their house.

Manjit would recycle old lead-acid batteries in the basement and sell the products at the ground floor, where the family lived. This means lead could have entered Vijay's body through several ways —the metal can be ingested through mouth, inhaled through the respiratory system or absorbed by the skin, as per the World Health Organization (WHO). After learning about Manjit's occupation, doctors tested Vijay's blood lead level, which was 186 microgrammes per decilitre (µg/dL), much more than the tolerable limit of 5 µg/dL set by WHO. This was a clear case of lead pois-oning. "I read about battery recycling and metal toxicity but I never thought it would happen in my home," says Manjit. He has since shut the operation.

Treatment for lead poisoning involves chelation, in which the patient is given medication that binds with lead molecules and facilitates their excretion through urine. But when Vijay's case was referred to Abbas Ali Mahdi of the department of biochemistry at King George's Medical University, Lucknow, the doctor was hesitant to begin chelation as it can also lead to the loss of essential elements like

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iron, zinc and calcium. The university arranged more suitable medication from the US and Vijay underwent one round of chelation which lasted three-four months. Till today, his blood lead level hovers around 50 µg/dL, but he does not show any obvious signs of lead toxicity like weakness or poor physical growth (see 'What lead does', *p*22). His nutritional intake has improved, says Mahdi.

AN ONGOING CRISIS

Lead poisoning is not a new concern. For more than a century, scientists have been aware that the naturally occurring metal has no biological function that can benefit the human body, but can cause devastating physical and developmental impacts.

However, despite the awareness, lead toxicity continues to be a public health concern. Half the children in India report high blood lead levels, reveals a 2020 report by the UN Children's Fund (UNICEF) and Pure Earth, a US-based environmental health non-profit. The report says 275 million children in India record blood lead levels of beyond the tolerable limit of 5 µg/dL. Of these, 64.3 million children's blood lead levels exceed 10 µg/dL.

Adults are also affected by lead toxicity. In July 2022, Union government think tank NITI Aayog and the Council of Scientific & Industrial Research (CSIR) conducted a meta analysis of 89 datasets from 36 studies between 1970 and 2014; its results validate the UNICEF-Pure Earth report. In terms of average blood lead levels among the population, some 23 states exceed the 5 µg/dL margin; levels in the remaining 13 states and Union Territories cannot be determined as there is a lack of research and screening mechanisms to collect data. Bihar (average blood lead level of 10.42 µg/dL), Uttar Pradesh (8.67 µg/dL), Madhya Pradesh (8.32 µg/dL), Jharkhand (8.15 µg/dL), Chhattisgarh (7.46 µg/dL) and Andhra Pradesh (7.14 µg/dL) account for 40 per cent of the population with high blood lead levels (see 'Widespread problem', *p*20).

Further, a 2016 analysis by the Institute for Health Metrics and Evaluation (IHME), an independent population health research centre at the University of Washington School of Medicine, US, estimates that lead toxicity in India contributes to 4.6 million Disability-Adjusted Life Years (number of years lost due to disease burden) and 165,000 deaths annually.

Lead toxicity is not just a concern in India. The UNICEF-Pure Earth report notes around one in three children worldwide record blood lead levels of over 5 µg/dL. Countries with this burden include Iran, Afghanistan, Yemen, Peru, Vietnam, the Philippines and parts of Central Africa.

DEBILITATING IMPACTS

The adverse impacts of lead entering the human body have been known since 1920.

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"The Industrial Revolution caused an epidemic of metal intoxication, urging scientists and physicians of that period to study and identify specific symptoms and organ alterations related to chronic lead poisoning," says a 2012 study published in the journal *Safety and Health at Work* by researchers from Italy.

"Once lead enters the blood stream, it goes directly to the brain, particularly so in children. This is because there is no specific blood-brain barrier for lead that can restrict movement of the metal. During pregnancy, if the woman consumes lead in some form, there is no placental barrier either, so the lead is transferred to the foetus," explains Thuppil Venkatesh, professor emeritus at St John's Medical College, Bengaluru.

In a newborn, lead poisoning can result in premature birth, low birth weight and slow growth. In children and adults, it can cause anaemia as well as neurological, skeletal and neuromuscular illnesses. The UNICEF-Pure Earth report says children with elevated blood lead levels scored three-five points lower on intelligence tests. This "permanent damage (affects) a child's brain development and central nervous system, (causing) reduced intelligence, attention deficit disorders and lower educational attainment," the report notes. This can lead to long-term impacts such as loss of economic productivity.

PRESENT EVERYWHERE

Science is clear on the impacts of lead toxicity and research indicates that a significant part of the population is affected. Why then, does the disease continue to remain widespread? In India, it could be due to the fact that lead does not get as much attention as other potential public health concerns. First of all, the country lacks systems to screen populations for possible exposure. India has some 48 national referral centres for lead projects where blood lead levels can be tested, but screening is usually done on a voluntary basis or at health camps by non-profits.

Even if screening occurs, determining the source of exposure is not easy. "In several circumstances, determining the source of (lead) poisoning is challenging since patients may not disclose their history of (lead) exposure, resulting in a late diagnosis. In addition, these situations often go unreported and untreated, or they are merely medicated symptomatically," notes the NITI Aayog-CSIR report.

Between 1996 and 1999, Venkatesh spearheaded a nationwide study to assess blood lead levels of 23,200 people, 30 per cent of whom were children. More than half the children less than 12 years of age and 40.2 per cent of those above 12 years of age studied had blood lead levels higher than 10 µg/dL. The study identified leaded petrol as a key source. India had already begun phasing out leaded fuel in 1994, first by introducing low-lead petrol and then by mandating use of unleaded fuel in April 2000. Other countries such as the UK took similar steps, which resulted in a decline in deaths associated with lead exposure. But the UNICEF-Pure Earth report says that India, in contrast, has recorded a 21 per cent increase in deaths caused by lead exposure since 1990.

This indicates that there are other sources contributing to lead toxicity. Richard Fuller, founder and president of Pure Earth, explains, "Sources of lead poisoning change from location to location, and there are usually multiple exposure sources in any given place."

According to the NITI Aayog-CSIR report, some common occupational and non-occupational sources of lead may be present all around people (see 'Everyday risks'). These include smelting and mining, which lead to a release of lead into the atmosphere risking lives of workers in these industries as well as those who live in nearby areas. The report notes agricultural practices close to smelting and mining industries have also resulted in elevated lead levels in meat, milk and soil.

There are measures to protect workers from toxic metal exposure under the Occupational Safety and Health Administration (OSHA) Regulations. However, since implementation of these norms is voluntary and there is no inspection agency, regulation exists only on paper,

Widespread problem

Some 23* states exceed the permissible blood lead level of 5 µg/dL

Note:* Although there are 23 states with high blood lead levels, the names of only the top 15 are publicly available and have been highlighted in the given map. Levels in the remaining 13 states and Union Territories cannot be determined as there is a lack of research and screening mechanisms to collect data
Source: "Assessment of Lead Impact of Human and India's Response", NITI Aayog and Council of Scientific Research

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says Venkatesh. Similarly, though the Factories Act, 1948, also has provisions to protect the health and safety of workers, it is difficult to cover all industries.

One lesser-known occupation in the report is "battery work". "Many developing and under-developing countries have a lack of stringent laws and poor policy implementation, resulting in poor government control over informal recycling sectors…As a result, enormous quantities of (lead)-acid batteries are recovered without using scientific techniques in an unregulated and uncontrolled way," the NITI Aayog-CSIR report says.

Management of lead-acid batteries came under the Batteries (Management and Handling) Rules, 2001. But enforcement capacity to ensure safe and environmentally sound recycling has been inadequate. "As a result, almost half of the used lead-acid batteries in India are still recycled in informal, uncontrolled and unregulated settings," says Fuller. Manjit's battery recycling operation is a case in point.

In 2022, the Union Ministry of Environment, Forest and Climate Change notified the Battery Waste Management Rules, 2022. The new rules aim at reducing share of battery recycling in the informal sector and stress on extended producer responsibility. It remains to be seen whether the government can successfully implement this, says Fuller.

One source that can be seen as both occupational as well as a common hazard is lead-based household paint. This source has been identified much earlier; in 2008-09, Delhi-based think tank Centre for Science and Environment tested paints made by major players of the time and found lead in 23 of the 25 samples tested (see 'Home truths', *Down To Earth,* 16-31 August, 2009). In multiple reports in 2007-11, Toxics Link, an environmental non-profit, also found dangerously high levels of lead in paint—140,000 parts per million (PPM)—as against the permissible 90 PPM set by the Central Pollution Control Board. Around this time, the country initiated a phaseout of lead-based paints. But even then, small and medium-scale manufacturers continue to record high levels of lead in their paints; some 31 per cent of household paints had lead concentrations of more than 10,000 PPM, as per information in the NITI Aayog-CSIR report. In 2017, the Centre implemented the Regulation on Lead content in Household and Decorative Paints Rules, but Toxics Link's recent research suggests lead-based paint is still produced.

Another common source is food. As of now, spices are the only identified sources of lead poisoning, as per experts. In northeastern states, the high moisture content does not allow for turmeric in the region to dry quickly, resulting in a lighter colour. This turmeric is transported to Bihar and West Bengal, where lead is added to the commodity to bring out a deeper yellow colour, says CSIR's Rakesh Kumar.

The Food Safety and Standards (Food Products Standards and Food Additives) Regulations, 2011, says the threshold for lead in food of 10 PPM. However, a 2014 study led by a researcher at KPC Medical College and Hospital, Jadavpur, published in the *International Journal of Current Medical And Applied*

Everyday risks

There is potential for lead exposure in several common occupations and products that are used in nearly every household

OCCUPATIONAL SOURCES	Non-Occupational Sources
Battery work	Traditional medicine
Mining	Vehicular exhaust
Glass manufacturing	Contaminated cosmetics and sindoor
Automobile repair	Household storage batteries
Ceramic work	Household paints
Painting	Contaminated spices
Pottery	Effluent from lead-based industries
Smelting	Contaminated soil, dust and water near lead-based industries
Printing work	Food grown in lead contaminated areas
Plumbing	Retained bullets
Soldering	Food stored or cooked in lead-coated vessels
Making lead pipes and plastic	Painted toys

Source: "Assessment of Lead Impact of Human and India's Response" , Niti Aayog and Council of Scientific Research

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WHAT LEAD DOES

Lead has no biological function in the body; rather, it can impair physical and developmental growth

1. FOETUS

INTAKE ROUTE
Placenta

EFFECTS*
Delay in neurological development
Premature birth
Low birth weight

TREATMENT PROTOCOL
Chelation and nutritional intervention for the mother

2. INFANTS, YOUNG CHILDREN

INTAKE ROUTE
Mother's milk, inhaled air, skin contact

EFFECTS*
Decreased activity of enzymes that produce heme
Impaired physical and developmental growth
Low intelligence quotient

TREATMENT PROTOCOL
Chelation and nutritional intervention

3. CHILDREN

INTAKE ROUTE
Inhaled air, skin contact, ingestion

EFFECTS*
Decreased nerve conduction velocity
Hampered cognitive development and intelligence
Hearing loss
Jaundice
Anaemia
Encephalopathy
Impact on vitamin D metabolism if lead is deposited on bones

TREATMENT PROTOCOL
Chelation (Medication that binds with lead and facilitates excretion through the urine); nutritional intervention to ensure that essential elements are not lost from the body

4. ADULTS

INTAKE ROUTE
Inhaled air, ingestion, skin contact

EFFECTS*
Decreased activity of enzymes that produce heme, an iron-containing compound crucial for all organs
Changes in blood pressure
Damage to renal function
Fluctuation in sperm count

TREATMENT PROTOCOL
Chelation; nutritional intervention for pregnant women

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Note: *Effects mentioned vary depending on blood lead level Source: Expert comments, World Health Organization

Science notes that among spice samples collected from local markets in Kolkata, "the highest levels of lead was found in chilli powder and turmeric powder, which greatly exceeded the permissible amounts."

There is a need to study the potential presence of lead in other foods, as seen in the case of the Maggi brand of instant noodles. In 2014-15, the noodles marketed by Swiss company Nestlé showed high levels of lead when tested for monosodium glutamate (MSG). The brand was banned for months in 2015, but returned to the market after the company passed health standards.

HOW TO FIGHT THIS

There are more than 20 occupations and household items that may be exposing people to high levels of lead, but research to even identify geographical distribution of sources appears to be lacking. Regular screening and testing of lead sources will inform about region-wise prevalence and help tailor interventions, such as "regulations and enforcement, changes in industry practices, training of government officials to assess lead contamination, and changes in public education and consumer behaviour," says the UNICEF-Pure Earth report. For instance, as recycling of used lead-acid batteries risks lead exposure, discouraging informal operations and regulating the sector will help.

The country must also enhance capacity for testing, currently done for blood lead levels. "This test only shows how much (lead) is present in circulating blood and not how much is stored in the body," says the NITI Aayog-CSIR report. Venkatesh adds that 48 centres around the country are not enough. "We have been asking the government to create facilities for blood lead level screenings at every district hospital," he says.

Next, as seen in Vijay's case, there are gaps in treatment protocols. CSIR underlines the need to train healthcare workers to monitor, detect and treat this condition.

The final tool is public awareness. Rajiv Kumar, former vice chairman of NITI Aayog, says "lead poisoning needs to be a part of the narrative of India's health status. We need to devise strategies on a state level, through regional bureaucracy, local press and vernacular language to have tangible impact." DTE @down2earthindia

Fighting chance

The new framework on biodiversity provides the opportunity for a fresh start, but countries must ensure implementation

VIBHA VARSHNEY DELHI

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Huang Runqiu, minister of ecology and environment of China and president of COP15 at the closing plenary in Montreal, Canada

THE YEAR 2023 begins with a new blueprint for conservation of biological diversity, its sustainable use and fair and equitable sharing of benefits arising from its use. As many as 188 nations, gathered at Montreal, Canada in December 2022, adopted the Kunming-Montreal Global Biodiversity Framework at the 15th Conference of the Parties (COP15) to the Convention on Biological Diversity (CBD) after 13 days of negotiations. "We have reached a historical, iconic outcome document, the Kunming-Montreal Global Biodiversity Framework. I believe that this document can guide us all in our efforts to hold and reverse biodiversity loss and put biodiversity on the path to recovery for the benefit of all humanity, especially our children and grandchildren," said Huang Runqiu, minister of ecology and environment of China and president of COP15.

PHOTOGRAPH: IISD.ORG

Implementation would be key to ensuring that the world meets the 23 targets identified in the framework by 2030, along with the four overarching goals that have to be reached by 2050. It will not be an easy road as Inger Andersen, executive director of the UN Environment Programme, points out. "I will be honest. Time is not on our side. We have backed nature into a corner, and it is time to ease the pressure." However, she adds that nature will bounce back if given a chance. This makes implementation of the framework an urgency.

Finalisation of the roadmap was already delayed by two years because of the COVID-19 pandemic, and members have to scramble fast to make up for the lost time. Despite three decades of work, countries have failed to meet the objectives of CBD, and the framework provides an opportunity for a fresh start.

30 BY 30

The new targets are ambitious, and among them, the 30x30 target can be called the most ambitious. Target 3 advocates that 30 per cent of land, inland water, coastal and marine areas need to be protected by 2030. At present, barely 17 per cent and 10 per cent of the world's terrestrial and marine areas are protected, which was the level of ambition under the Aichi biodiversity targets that expired in 2020. "Just as Paris produced an agreement to keep global temperatures below 1.5°C, in Montreal we have reached an agreement that commits to the protection of 30 per cent of global land and water by 2030," Steven Guilbeault, Canada's minister of environment and climate change, said after the framework was finalised on December 19.

Efforts have been made to ensure that the world delivers on Target 3. For one, the final text of the Global Biodiversity Framework clearly mentions that these areas need to be managed recognising indigenous and traditional territories and identifying and respecting the rights of indigenous peoples and local communities. Besides, countries have pledged more finances for biodiversity conservation under Global Biodiversity Framework, as compared to Aichi target.

COLONIAL NARRATIVE?

The International Indigenous Forum on Biodiversity has praised the final text for its strong language on respect for the rights of indigenous peoples and local communities. But after their last-minute call for indigenous territories to count towards the 30 per cent target was rejected by European countries, the

PLAN TO UNDO DAMAGE

Nations adopt four goals, 23 targets in Kunming-Montreal Global Biodiversity Framework

Goals for 2050:

Maintaining, enhancing and restoring the integrity, connectivity and resilience of ecosystems || Sustainable use of biodiversity || Fair and equitable sharing of benefits with Indigenous People and Local Communities || Ensuring means of implementation including finances, technology and capacity building

Targets for 2030

Reducing threats to biodiversity

- Land and sea use planning to ensure zero loss of areas of biodiversity importance
- Restore 30 per cent of degraded ecosystems
- Conserve 30 per cent of land, inland water, coastal areas and oceans
- Halt human induced extinction of species and genetic diversity
- Sustainable harvest, trade and use of wild species
- Reduce risk from invasive alien species
- Reduce risk from pollution
- Minimise impact of climate change and ocean acidification

Meeting people's needs through sustainable use and benefit-sharing

- Ensure sustainable use of biodiversity
- Promote management of agriculture, aquaculture, forestry using sustainable practices
- Restore ecosystem functions and services, including air quality, water quality and quantity
- Access to quality green and blue spaces in urban areas
- Legal and administrative capacity building to ensure equitable benefit sharing from genetic resources and digital sequence information

Tools and solutions for implementation and mainstreaming

- Mainstreaming biodiversity
- Take policy measures to ensure that businesses disclose impact on biodiversity
- Support policies for sustainable consumption
- Strengthen biosafety measures
- Reduce harmful subsidies
- Increase financial resources
- Strengthen capacity-building and promote technical and scientific cooperation
- Make available data, information and knowledge for equitable participation in decision-making
- Ensure equitable participation of community in decision-making and their protection
- Ensure gender equality such that women and girls have equal opportunity to contribute to the objectives of the Convention on Biological Diversity

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activists said the framework is a demonstration of the colonial mentality in conservation, which advocates that Western conservationists know best. In a statement, international human rights organisation Survival International also says that the framework has failed indigenous people by not recognising that they are the best conservationists and that the best way to protect biodiversity is to protect their land rights. According to the International Union for Conservation of Nature, about 80 per cent of the biodiversity is located on the territories of indigenous peoples and local communities.

To help achieve the 30x30 target, the framework has additional objectives that propose the restoration of 30 per cent of degraded terrestrial, inland waters and coastal and marine ecosystems along with reducing the loss of areas of high biodiversity importance to near zero. Risks to biodiversity are also being lowered through reduction in use of nutrients and pesticides and highly hazardous chemicals by half. There is a plan to phase out or reform subsidies that harm biodiversity by US $500 billion per year along with a target to reduce food waste by half and significantly reduce overconsumption and waste generation—all of which lead to biodiversity loss.

A NEW, DEDICATED FUND

COP15 had some success in increasing the availability of funds for biodiversity conservation. Target 19, which calls for increasing financial resources, prescribes that at least $200 billion per year needs to be mobilised from all sources and that developed countries need to provide to developing countries at least $20 billion per year by 2025 and $30 billion per year by 2030—this too is a 30x30 target.

But Goal D of the framework accepts a finance gap of $700 billion per year would still remain. To increase funding, private industry and initiatives such as the High Ambition Coalition for Nature and People, an intergovernmental group of more than 100 countries; Leaders' Pledge for Nature, supported by 70 countries to reverse biodiversity loss by 2030 for sustainable development; and 10 Point Plan of the UK have been roped in. This is a cause for worry as private interests can hamper the work on biodiversity protection, activists say.

A dedicated fund for biodiversity, the Global Biodiversity Framework Fund, is slated to be created in 2023 under Global Environment Facility, with its own governing body to support the implementation of Global Biodiversity Framework. The Facility was established in 1992 along with CBD at the Rio Summit and is the world's largest funder of biodiversity protection, nature restoration, pollution reduction, and climate change response in developing countries.

The Global Environment Facility would also handle the funds generated through the implementation of Goal C and Target 13 on access and benefit sharing of biological resources, including those from the use of digital sequence information on genetic resources. Delegates have agreed to establish within the Global Biodiversity Framework a multilateral fund for equitable sharing of benefits between providers and users of digital sequence information on genetic resources, to be finalised at COP16 in Türkiye in 2024. Benefit sharing on digital sequence information is a new concept in the framework. "Over years as more and more of this genetic information is digitised and stored in global databases this can undermine the requirement of benefits sharing," explains David Cooper, deputy executive secretary, CBD. "Decision on digital sequence information is a landmark shift," he said in the final press meeting for COP15. The agreement on digital sequence information sets a precedent for access and benefit sharing in health and agriculture.

COUNTRIES WILL NOW HAVE TO UPDATE NATIONAL BIODIVERSITY STRATEGIES AND ACTION PLANS TO REFLECT THE GLOBAL BIODIVERSITY FRAMEWORK AND HOW THEY WILL CONTRIBUTE TO ACHIEVING IT

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By COP16 in 2024, governments have a lot of homework to do to turn the agreed goals and targets into actions at home. Countries will now have to update their national biodiversity strategies and action plans to reflect the Global Biodiversity Framework and how they will contribute to achieving it. Countries will monitor and report every five years or earlier on a large set of indicators related to progress. CBD will combine the national information submitted by late February 2026 and late June 2029 into global trend and progress reports. "The real hard work of implementing it begins now. What we are trying to do is not easy, we hope this framework would make the path a little easier," says Cooper. DTE

@vibhavarshney

Plastic waste is projected to triple by 2060. Two-thirds of the projected waste is expected to be made up of packaging, consumer products and textiles

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Discord from the beginning

Industry hijacks the first round of negotiations on proposed global plastic treaty as countries talk in differing voices

SIDDHARTH GHANSHYAM SINGH DELHI

ON DECEMBER 2, 2022, negotiators responsible for carving out a global treaty on ending plastic pollution by 2024 concluded their first ever meeting in Punta Del Este, Uruguay. The five-day meeting of the intergovernmental negotiating committee, which began on November 28, showed glimpses of what is in store over the next two years. Countries spoke in different voices, with their individual interests in mind and many negotiating teams saw strong representation from the industry, which until recently opposed the treaty that was agreed upon by all 195 UN member-states at the resumed session of the fifth United Nations Environment Assembly (UNEA), held in Nairobi, Kenya, between February 28 and March 2, 2022.

The negotiation process was attended by member-states from regional groups, along with major groups that include the civil society and other stakeholders, and observers that include individuals and bodies not enrolled under UN Environment Programme but have a stake in the treaty. Surprisingly, industry representatives attended the event both as part of the member-state delegations

PHOTOGRAPH: VIKAS CHOUDHARY / CSE

and as major groups. In fact, the industry participated even in the regional group meetings that were held on the sidelines, where the member-states decided their stance on the issue. Most of these meetings were closed door, and often did not allow the civil society. For instance, the Asia-Pacific region refused the participation of civil society organisations in its regional meetings, but allowed the industry.

"Allowing the very companies that are driving the harms caused by plastic pollution to have an equal seat at the table sets a concerning precedent for the negotiations to come. We cannot allow plastic producers to take control of this process while vulnerable communities struggle with equitable access and having their voices heard in these spaces," says Christina Dixon, ocean campaign leader at the UK-based non-profit Environmental Investigation Agency.

The first event at the meeting, the Multi-Stakeholder Forum, was aimed at finding common ground between environmental justice groups, waste pickers, public health professionals, environmentalists, and the petrochemical industry. "That is a recipe for failure. Instead, the treaty process should have followed the precedent of the Framework Convention on Tobacco Control, which excluded the tobacco industry from its negotiations. The plastics/petrochemical industry is not part of the solution, it is the problem," says Neil Tangri, science and policy director at the US-based non-profit Global Alliance for Incineration Alternatives.

The discrimination did not end there. Usually, at UN meetings, specific time is allocated to member-states, major groups and observers to voice their interventions, and they play a crucial role in guiding the discussions. The regional groups and member-states normally get to speak first, followed by the major groups, and finally, if time permits, observers also contribute. But it was decided that for the remaining four meetings to finalise the treaty, major groups and observers will clubbed together. This means the civil society will have lesser time to voice their concerns.

Meanwhile, nothing concrete came out of the initial discussion, with countries failing to even come to a consensus on the decision making process. While some countries pushed for voting with a two-thirds majority, many others, including India, demanded complete agreement to take decisions at the meeting, which means even if one of the member-states has a problem, contentious points will have to be re-discussed.

WHILE THE AMBITIOUS GROUP OF COUNTRIES, LED BY NORWAY AND RWANDA, DEMANDED FOR A LEGALLY BINDING TREATY, UNAMBITIOUS COUNTIES, INCLUDING THE US AND CHINA, CALLED FOR VOLUNTARY COMMITIMENTS

The member-states, depending on their positions at the meeting, could be labelled as neutral, ambitious or unambitious. The High Ambition Coaltion, led by Norway and Rwanda, demanded a legally binding treaty that will revolve around three principles: restrain plastic consumption and production to sustainable levels, enable a circular economy that protects the environment and human health and achieve environmentally sound management and recycling of plastic waste.

The unambitious group called for voluntary commitments by countries, depending on their capabilities. The US, one of the largest plastic-producing nations, said countries should be allowed to voluntarily prioritise the most important sources and types of plastic pollution. Saudi Arabia insisted that the interests of oil-producing countries should be considered while negotiating the treaty. China justified the call for voluntary commitments on the flimsy ground that implementing universal commitments would be difficult. The neutral countries, including India, mostly remained silent during the negotiations.

The only silver lining at the meeting was the decision to set up a voluntary body, the Group of Friends of Waste Pickers, which will serve as a platform for regular exchange, dialogue and consultation among member-state representatives, and highlight the good waste management practises to be included in the debate.

Overall, the pace at which the negotiations progressed at the first meeting has left the civil society worried over whether the 2024 timeline will be met. This is alarming as in a business-as-usual scenario, plastic waste is projected to triple by 2060, according to the latest forecasts by the OECD's Global Plastics Outlook, rising from 353 million tonnes of waste in 2019 to 1,014 million tonnes in the next four decades. Two thirds of this is expected to be made up of packaging, consumer products and textiles. DTE

@down2earthindia

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FAKE FABRIC

The moment you consider polyester just a fabric, it escapes attention as a pollutant. The fact is that polyester is a form of plastic and the second biggest by-product of petrochemicals. Yet only a few countries have regulations to manage the plastic fibre. Time India framed laws to regulate the textile industry and brought it under the extended producer responsibility regime

ZUMBISH, MINAKSHI SOLANKI and **SIDDHARTH GHANSHYAM SINGH**
report from Panipat and Delhi

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PHOTOGRAPHS: VIKAS CHOUDHARY / CSE

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BELIEVE IT or not, most of our clothes today have plastic in them. From the warm, shiny fleece jackets we wear to brave the winter chill to body-hugging workout clothing to stretchy and comfortable lowers, all the apparel is either completely made out of plastic fibres such as polyester, nylon and acrylic, or from the blending of natural fibres such as cotton and wool with the synthetic material.

About 60 per cent of material made into clothing is plastic, which includes polyester, acrylic and nylon textiles, says the UN Environment Programme (UNEP). The global production of polyester, the most commonly used plastic fibre, has increased by nearly 900 per cent between 1980 and 2014, as per November 2022 report released by US-based non-profit Fibershed.There is a reason the textile industry is so fond of polyester. Despite being tough and durable, it creates new possibilities of fashion. Clothes made out of polyester hold their shape well, are lighter, wrinkle-free and resistant to shrinking and colour fading. But perhaps the most important reason for its popularity is that garments made from synthetic fibres are substantially cheaper than natural fabrics. In April 2019, the cost of polyester yarn in India was ₹105 a kg, while cotton yarn was more than double at ₹213, as per the latest data released by the Union Ministry of Textiles. While on the face of it, clothes made of plastics appear harmless, their infiltration into the textile industry is a cause for concern. These synthetic fabrics have significant environmental impact during production, use and disposal.

Plastic fibres have high carbon footprint as they are mostly derived from fossil fuels. The apparels industry is responsible for 10 per cent of the global carbon dioxide output—more than international flights and shipping combined, says UNEP. At its current pace, the industry's carbon emissions will increase by over 50 per cent by 2030. It is also responsible for one-fifth of the 300 million tonnes of plastic produced globally each year, as per the World Bank. Today, synthetic fibre accounts for 69 per cent of all fibre production in the world.

About 60 per cent of material made into clothing is plastic, which includes polyester, acrylic and nylon textiles. Global production of polyester, the most commonly used plastic fibre, has increased by 900 per cent between 1980 and 2014

They require high amounts of energy to be produced, and, though theoretically recyclable, the used products almost always end up in landfills or get burned for energy. "As an oil-based plastic, polyester does not biodegrade like natural fibres. Rather it stays in landfill for several decades at least—and potentially for hundreds of years," according to Common Objective, a global network of fashion brands.

Small wonder, plastic fibres are single-handedly responsible for fuelling "fast fashion", a trend in which consumers buy and dump clothes at a dizzying rate. In 2000, the world produced 50 billion new garments; nearly 20 years later, that figure has doubled, according to UK-based Ellen MacArthur Foundation that promotes circular economy. "People buy 60 per cent more clothes today than what they were buying 15 years ago and wear the clothes for half as long before discarding them," says Urska Trunk, campaign manager at Changing Markets Foundation, a global organisation promoting sustainable industrial practices.

Still, governments are actively aiding in the proliferation of synthetic fabrics. India, for example, is banking heavily on polyester to double its textiles export in the next six years, from US $40 billion in 2020-21 to $100 billion, as announced by Piyush Goyal, Union Minister of Textiles, Consumer Affairs, Food & Public Distribution and Commerce & Industry, at an industry event in Delhi on October 27, 2022. So far, the textiles industry in India is mainly driven by natural fibres. They accounted for 70 per cent of the textile exported in April-December 2021. But this story is set to change soon. The country's reliance on polyester is likely to cause major challenges as it is yet to devise legal frameworks or guidelines to handle the waste.

PROFIT ALL THE WAY

Polyester is not a new fabric. Discovered in the late 1930s, the fabric's market rapidly expanded in the 1970s in the developed

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world (see 'Plastic in fashion'). Almost half a century later, the polyester problem continues to only worsen. One of the main reasons for this is that the global discussion has majorly focused on textile waste management and not on production. This narrative has put the spotlight on consumers and their consumption pattern, while absolving the real culprits: the petrochemical companies and brand owners.

The International Energy Agency (IEA) estimates that plastics will be the largest driver of demand for oil in the next two decades. Textiles are the second-largest product group made from petrochemical plastics after packaging, making up 15 per cent of all petrochemical products, suggests "The Future of Petrochemicals" report released by IEA in 2018. Experts say that high-end brands, not consumers, are responsible for the "make-take-dispose" business model. "The fast fashion business model, which inherently relies on driving increased consumption of new products, is responsible for creating an intensely competitive, highly extractive, and deeply inequitable system to which the industry has become complicit," writes Brittany Sierra of Dubai-based nonprofit Sustainable Fashion Forum, in a recent article "Should Fast Fashion Brands Be A Part of the Sustainability Conversation?"

The problem does not end here. As consumers become aware of the environmental cost of the textile industry, brand owners greenwash by providing misleading and false information on the environmental footprint of products. In September 2022, the Netherlands Authority for Consumer & Markets directed apparel brands H&M and Decathlon to remove sustainability labels from their products and websites as they were making misleading claims. In its investigation, the Dutch regulator found that H&M was making sustainability claims such as "conscious" and "conscious choice", without explaining what they meant, or providing a description of the sustainability benefits of the products.

Trunk explains that brands today claim sustainability just because polyester can be recycled. But there is a huge difference between recyclability and what eventually gets recycled. "Most brands claim that their synthetic products are recyclable despite having neither a take-back scheme nor fibre-to-fibre recycling technology in place to guarantee this," she says.

PLASTIC IN FASHION

Born in a research lab in the 1930s, plastic fabrics such as polyester and nylon have over the years become an integral part of our wardrobe. In 2020, some **52% of global fibre production** was polyester

1940

Nylon, a petroleum-based fibre, is developed by DuPont in the 1930s. By the 1940s, it is popularised as a replacement for silk in women's hosiery

1960

The popular hippie movement of the 1960s promoted flowy, colourful fashion, often made from inexpensive polyester

1980

Leisure suits are most often crafted from polyester, while stretchy dance fabrics are made from elastane. By the 1980s, polyester is popularly used to make clothes for aerobics

2000

In the 1990s, warm fleece jackets become popular, despite their polyester makeup and terrible plastic-shedding problem. By 2000, polyester becomes the preferred fabric of most appeal brands, allowing them to popularise the make-take-discard business model

2020

With heightened environmental concerns, brands are quick to hop on the "sustainable" fashion bandwagon. But their solutions are often misguided or deceptive, incorporating recycled plastic, which only serves to create more plastic pollution in the long run

Source: "The Hidden Story of Plastics in Our Clothes" released by US-based non-profit Fibershed on November 15, 2022

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HIDDEN COST

The textiles industry has always had a high environmental cost. Growing natural fabrics drains a lot of natural resources. As per the UN, cotton farming uses only 3 per cent of the arable land worldwide, but consumes "24 per cent of insecticides and 11 per cent

of pesticides". The industry also relies heavily on chemicals for dyeing and other processes. The infiltration of polyester has only added to the problem. While synthetic fibres have less impact on water and land than cotton, they emit more greenhouse gases per kg. "Polyester production for textiles released about 706 billion kg of greenhouse gases in 2015, the equivalent of 185 coal-fired power plants' annual emissions," as per a 2017 article by non-profit World Resources Institute.

Synthetic textiles also shed tiny pieces of plastic with every wash and wear. These microplastics pollute the oceans, freshwater and land and pose a danger to the animals that consume them, inhibiting their growth and reproduction. Recent research suggests that it can also adversely affect human health, though conclusive links have yet to be established. Albert Koelmans, an environmental scientist at Wageningen University in the Netherlands, in a report released on March 2, 2021, claims that people might be ingesting microplastics around the mass of a credit card every year.

Synthetic textiles account for 12 per cent of the microplastics in the oceans as per "Primary Microplastics in the Oceans" released by the International Union for Conservation of Nature in 2017. "Clothing and textiles (made out of plastic) can break down with use, which may shed microplastics and antimony (a toxic element used in polyester production) in our homes, build up in dust, and may enter our bodies when we breathe, eat, and touch things around us," says a report by non-profit Defend Our Health. Dharmesh Shah, senior advisor at LIFE, a public interest environmental law group, says companies currently do not disclose the chemicals they use to make polyester or other plastics, but many of the chemicals are bad for human health. "Due to lack of information, polyester should not be mistaken as safe," he says.

Problems also exist in the way textile waste is handled. An investigation by Greenpeace, UK, has found that garment waste from clothes made for Nike, Ralph Lauren and other brands is burnt in brick kilns in Cambodia. As the majority of these garments are likely to be made from polyester, the burning exposes bonded workers to toxic fumes and microplastic fibres. Similarly, big brands are known to be indulging in dumping, an illegal practice of selling unused clothes in developing countries at a lower-than-original price. This destroys the local market in developing countries.

Recyclers at Panipat say they mix virgin and recycled polyester fabrics to maintain the quality of the end products

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LOSING ADVANTAGE

Unlike the West, the concept of reusing and recycling textiles is culturally ingrained in India. Most households either repurpose their old clothes or give them away for reuse. There are also communities that take old clothes in lieu of utensils and then sell the clothes in the secondhand market.

The country also has a strong informal sector that collects textiles and other waste after it is dumped by households. This par-

PROBLEMATIC FROM START

Fashion industry relies heavily on fossil fuels for raw materials and is responsible for 10 per cent of the global carbon dioxide emissions—more than what is emitted by international flights and shipping combined

Extraction of raw material

- Petrochemical companies provide the raw material for polyester, a form of plastic that is used to make garments, as it is cheaper and more durable than natural fibres such as cotton
- Still, the discussion around making the textiles industry sustainable seldom includes the petrochemicals

Virgin polyester

- Reliance Industries is the world's largest producer of virgin polyester, which is more energy intensive than natural fibres

Recycled Polyester

- It can be derived from discarded virgin polyester products and PET bottles

Apparel brands, manufacturers

- Manufacturers are flooding the market with cheap polyester clothes, and this is pushing consumption at an alarming rate
- People buy 60% more clothes today than what they were buying 15 years ago and wear the clothes for half as long before discarding them

Recycle, downcyle

- As most garments are made of blended fabric, they are eventually downcycled into home furnishing products

Landfill, incineration

- Lack of proper collection mechanism means major portion of polyester waste ends up in landfills or is burnt as fuel

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Source: Compiled by Centre for Science and Environment

tially explains why the share of textile waste in Indian landfills is substantially lower than the rest of the world. While there is no data, a rough estimate suggests textiles account for 5-6 per cent of the entire waste from cities, says Swati Sambyal, a waste management expert at UN-Habitat. "India's post-consumer textile waste footprint is relatively low compared to high-consumption economies like the US. However, just like with plastics, we need to evaluate the environmental footprint of clothes and fast fashion from a lifecycle perspective, which includes manufacturing as well," says Shah.

India's Reliance Industries is one of the world's largest producers of virgin polyester, and the country is also a major recycling hub. The major polyester recycling centres exist in Panipat in Haryana, Ludhiana and Samana in Punjab, Ahmedabad, Surat, Rajkot and Gandhinagar in Gujarat.

Down To Earth visited the Panipat second-hand market, situated some 90 km from Delhi, to understand how the industry operates. Traders say that over 70 big and small recycling units exist in the industrial cluster, and they receive second-hand clothes primarily from Morocco, Dubai, Canada and the EU. "Except for Surat, where polyester clothes are recycled to make new clothes, all the other hubs in India downcycle to make home furnishing products, particularly carpets," says Paras Ali, managing director of Global Textile Overseas, a Union Ministry of Textiles-certified recycling unit at Panipat. "Almost 80 per cent of the downcycled products are exported, while the remaining 10 per cent are used to meet domestic demand," says Ali.

After import, the garments are first sorted, then shredded and pulped to make a range of products from doormats to blankets and bed linen. "The end product is a mix of recycled and virgin polyester. For example, most carpets in Panipat have 60 per cent recycled polyester and 40 per cent virgin

Textiles account for almost 17 per cent of the total waste that gets dumped at the Bhandwari landfill in Gurugram

polyester," says Ali. "The quality of the finished product improves with increasing virgin polyester content," he adds.

Recycling unit owners say that the home furnishings that are produced at Panipat cannot be recycled again, and are sent to landfills or burned at the end of their life.

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TIME TO CHANGE

Industry experts agree that polyester is here to stay as natural fabrics cannot meet the ever-rising demand for textiles. They, however, warn that the current model is not sustainable. India needs to recognise polyester textile waste as plastic. This is crucial as the country currently has strong legislation to handle plastic waste but nothing on textile waste, which is broadly covered under the Municipal Solid Waste Rules, 2016.

At present, the informal sector operates in two ways: door-to-door collection of municipal solid waste and collection of textile waste from open dumps and landfills or dumpsites "Some discarded textiles are used by the poor people for sanitation purposes. Textile waste from households is also sold to automobile repair shops," says Shashi Bhushan, secretary, All India Kabadi Mazdoor Mahasangh.

Experts say the first step is to make the fashion industry accountable. "They are not thinking about sustainably designing their products because they are not accountable," says Shah. As a result, most clothes are made of blended fabric, which makes them extremely difficult to recycle. A 100 per cent polyester shirt can be recycled into a new shirt and this can be done several times before being downcycled. In the case of it being blended, it can only be downcycled into carpets, and this process can be done only once, after which it has to be sent to a landfill, says Ali. There is also little transparency. "We do not know the chemicals they use for the production and dyeing of plastic fibres and there is no tractability about how they source polyester," Shah says.

One of the ways to address the problem is by introducing extended producers' responsibility (EPR) for polyester to put the onus on the brand owners responsible to make the sector circular. In India, EPRs exist for plastics, tyre, battery and e-waste sectors, where industry players have specific targets to collect and recycle waste. In European countries, EPRs also include a component of product design, under which manufacturers are encouraged to develop products that are easily recyclable.

Besides cleaner production, it will also improve the collection rate of textile waste before it reaches the landfill.

It will also benefit the informal sector, which is already playing an essential role in collecting, segregating and giving the fabric

PHOTOGRAPH: ZUMBISH / CSE

back to the brand/manufacturer through a channel. Textile waste is usually sold in Delhi and neighbouring places at ₹2-3 per kg in comparison to other high value items that are sold at a much higher price, for instance, PET bottles are sold for ₹20 a kg, aluminium foil is sold for ₹20-25 a kg, aluminium containers for about ₹30 a kg, milk pouches for ₹5 a kg.

France introduced EPR for textile and footwear industry in 2008 and the transition has improved the collection rate. Manufacturers in the European country need to register and fund Re_fashion, an organisation set up by the government. The organisation then uses the funds to "manage the waste for articles placed on the market for consumers". In 2020, the scheme's 4,096 members paid $36 million as EPR, of which $17 million went to sorting operators, $4 million to community projects and almost $1 million to innovative projects. Of the 517,000 tonnes of products that hit the French market in 2020, some 204,000 tonnes were collected—a collection rate of 39 per cent. This is up from 27 per cent in 2013.

Even the EU, in its Waste Framework Directive, has asked its member-states to set up separate collections for used textiles and garments by January 1, 2025, to ensure the waste can no longer be sent to landfills or incinerated. EPR will most likely be the financial instrument that ensures it happens.

There is another worrying trend emerging in Indian cities, which is moving towards mechanised sorting and treatment of waste through formal industries and, in the process, reducing the role of the informal sector. Researchers from the Delhi-based non-profit Centre for Science and Environment recently visited Indore, the cleanest Indian city as per the Centre's Swachh Survekshan campaign, and found the city was diverting all of its textile waste to cement kilns. "Burning waste in cement kilns is like moving the landfill from the ground to the sky," says Monica Wilson, associate director of international non-profit Global Alliance for Incinerator Alternatives.

Overall, the textile industry needs to transition to a circular economy, suggests "Circular Textile and Apparel in India: Policy Intervention Priorities and Ideas", released by Delhi-based non-profit Centre for Responsible Business in April 2022. For this, the government must release clear guidelines for production and waste management. The guidelines should also ask manufacturers to include the cost of collection at the end of life in the final price. The government should also make resource audits mandatory for the industry.

Finally, there is a need to work with alternate materials such as hemp and banana fibre that are less water and energy intensive, can be easily recycled, and are more durable. Such alternatives exist in the market, but their uptake is limited as little research and development have been carried out on their feasibility. DTE @down2earthindia

Fuelling war

Reliance and Hengli, the largest polyester producers, are sourcing cheap Russian fuel during the ongoing war

AT LEAST 39 global apparel brands, including Nike, Wrangler and Levi's, are indirectly sourcing oil from Russia via two of the largest polyester manufacturers in the world—India's Reliance Industry and China's Hengli Group. Russia has become the largest oil supplier to Reliance Industries and its polyester manufacturing, suggests a report by Netherlands-based non-profit Changing Markets, released on November 4, 2022. The investigative report, "Dressed to Kill: Fashion brands' hidden links to Russian oil in a time of war", found that Hengli Group was also purchasing Russian oil to make its polyester-based products.

Polyester yarns and fabrics by both companies are then sold to garment manufacturers around the world, who in turn produce clothes for many of the world's largest brands. Even though over 25 of the 39 brands (including Adidas and ESPRIT) have suspended or withdrawn their operations in Russia after its full-scale invasion of Ukraine in February 2022, through their reliance on synthetics they continue to indirectly fund the war, alleges the report.

"During Russia's full-scale invasion of Ukraine, Reliance has increased the amount of oil it buys from Russia 12-fold; from €67.4 million (US $72 million) per month before the invasion of Ukraine to €829.4 million ($882 million) per month by July 2022, making Russia its biggest oil supplier," states the report. The investigation goes on to show that the company is taking advantage of discounted prices of Russian oil, undermining efforts by the West to cut funding to Russia's war on Ukraine. By May 2022, China's imports of Russian oil had soared by 55 per cent compared with a year earlier, with Hengli purchasing discounted crude oil from the country.

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Lantana camara behaves like a shrub in well-lit areas (inset) and like a creeper (above) in forests, where tree canopies stop sunlight from reaching the ground

PHOTOGRAPH : INDIRA SRINIVASAN

DEEP INVASION

Invasive ornamental shrub lantana is altering traits, fast spreading across India's forests

SHUCHITA JHA DELHI

IT IS not easy for any species to outperform the natives that have already adapted to local surroundings. But lantana (*Lantana camara*), an ornamental shrub, has mastered the art of invasion and is further honing its skills.

Since lantana was first introduced to the country from Latin America in the early 1800s, the weed has spread all over the country. The "India State of Forest Report 2021", released in January 2022, states that more than 9,793 sq km—an area larger than Sikkim—is under lantana. In fact, the spread of lantana is only marginally less than the combined spread of 28 other invasive species. At places, it has also taken over the biodiversity, choking out the native flora. For instance, in 1997, some 96 per cent of the Western Ghat reserve was under native flora, while 4 per cent was under lantana. By 2018, the area under native flora had shrunk to 53 per cent, while lantana occupied 47 per cent of the reserve, as per Bengaluru-based non-profit Ashoka

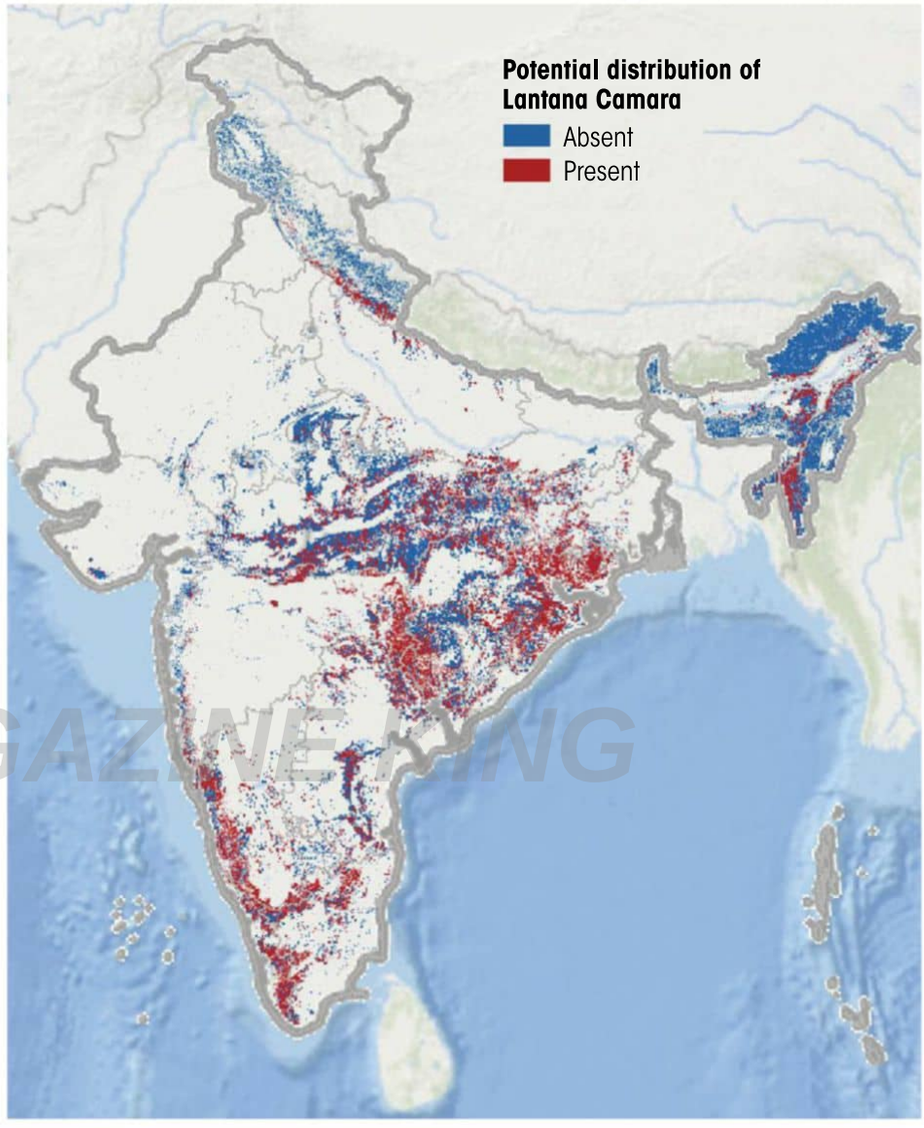
Trust for Research in Ecology and the Environment.

Now, researchers say that the invasive weed has started to infiltrate the dense forests in the country. Almost 44 per cent of India's forests might have already been invaded by lantana, suggests a 2020 study published in the journal *Global Ecology and Conservation* (see 'Major attack'). For the study, "Expanding niche and degrading forests: Key to the successful global invasion of *Lantana camara* (*sensu lato*)", researchers Ninad Avinash Mungi, Qamar Qureshi and Yadvendradev Jhala of the Wildlife Institute of India, Dehradun, surveyed 207,100 sq km of forests in 18 states and found the weed across 86,806 sq km.

The study, based on spatial data, says that lantana has expanded its climatic niche worldwide, with more than 11 million sq km suitable for its invasion.

Major attack

Lantana threatens 44 per cent of Indian forests



Source: "Expanding niche and degrading forests: Key to the successful global invasion of *Lantana camara* (sensu lato)" study published in the *Global Ecology and Conservation* in April 2020

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CHANGING CHARACTER

Researchers with the Forest Research Institute in Dehradun, Uttarakhand, have observed that lantana is changing its characteristics to gain a foothold in forests. Lantana primarily invades open, well-lit environments and avoids less sunlit areas. It is also known to exhibit adaptive modulations for proliferating heterogeneous environments like grasslands, farms and rural and urban settings, notes the study, published in the journal *Plant Science Today* in February 2022. The woody shrubs have multiple stems and are usually less than three metres tall in well-lit regions. But in order to grow in forests, where the sunlight gets blocked by dense canopies, lantana species transform into creepers and grow up to six metres tall, notes the study.

Calling the species opportunist, lead author of the study Abhishek Kumar explains invasive alien plant species like the lantana have high phenotypic plasticity, which is the ability to alter physical traits when exposed to different environmental conditions. Lantana species that grow in the shade, for instance, reproduce through vegetative propagation (a process in which plants reproduce from stems, roots, leaves and other parts). This allows them to spread across the forest floor or climb closer to the crown of the trees. In well-lit areas, the same plant uses seeds to propagate, says Gyan Prakash Sharma, assistant professor, Department of Environmental Studies, Delhi University.

Lantana plants in the shade also have greater distance between the nodes (the location on a stem to which a leaf or branch is attached) and larger leaves when compared to the those found in well-lit areas, says Sharma's 2018 study "It takes

two to tango: variable architectural strategies boost invasive success of *Lantana camara L. (sensu lato)* in contrasting light environments" published in *Springer Nature* (see 'Adapting to new environment').

Mungi says that the infestation of lantana in protected areas could be the reason for the increase in India's forest cover in recent years. "Currently, we believe that these distinctions between native forest, forest plantations and forests dominated by invasive species are not differentiated appropriately in the report to justify the increase in forest cover," he says.

GROWING MENACE

Lantana restricts the diversity of native species, including herbs, says Sharma. The plant also reduces soil fertility by uptaking water and nutrients faster than the native species. Mungi says conserving native species is key to sustain biodiversity amid changing climate. Lantana weakens this resilience.

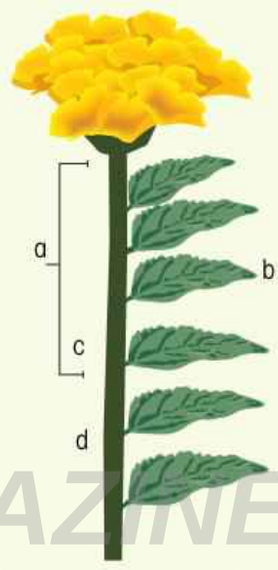
"The dense invasion of lantana in the understory (a layer of vegetation beneath the main canopy of a forest) of seasonally dry forests is escalating extreme fire events. Seasonal fire has been common in many of these natural systems; however, it burns relatively low on understory grasses. With lantana spread between the grassy understory and tree canopies, the fire escalates in height and burns for a longer time," says Mungi.

India spends US $18,700 (approximately ₹15.5 lakh) per sq km annually to contain lantana, says Mungi. If its invasion and expansion go unchecked, the country could lose $5.5 billion per year, he adds. Experts warn that the changing nature of lantana will add to the challenge of managing the species.

Adapting to new environment

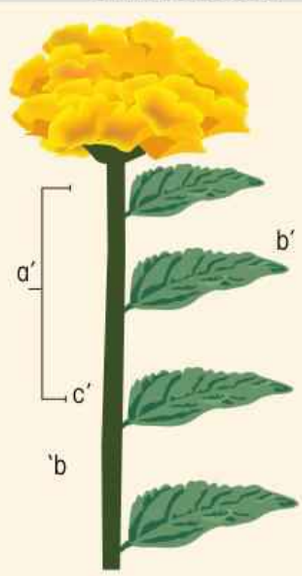
Lantana has altered several physical traits to increase its chances of survival in forests

SUN-LIT AREAS



a = Higher node density; b = Smaller leaf area; c = Shorter petiole length; d = Smaller internode distance

SHADED AREAS



a′ = Lower node density; b′ = Larger leaf area; c′ = Longer petiole length; d′ = Greater internode distance

Source: "It takes two to tango: variable architectural strategies boost invasive success of Lantana camara L (sensu lato) in contrasting light environments" study published in *Springer Nature Switzerland* in August 2018

Currently, the country uses the "cut root-stalk" method to get rid of lantana bushes. In this method, the aim is to chop down the main stem 2-3 cm below the ground. "This method has not been very successful. The remains of the root system of the plant persist in the soil, and as soon as the plant gets favourable conditions, it regenerates," says Kumar. He adds that it is an expensive, labour-intensive and time-consuming method.

Sanjay Singh, scientist with the Indian Council of Forestry Research and Education echoes Kumar's thought. He in his research "Biological-control of *Lantana camara* through crop competition using native species", published in the *Indian Journal of Tropical Biodiversity* in June 2018 has identified 13 native species that have the potential for restoration of lantana-invaded forests as they grow as associates, and restrict the growth of lantana. "Six of the 13 species have a negative correlation with the density of lantana; when their density increased, lantana decreased, says Singh. These are *Combretum decandrum, Olax scandens, Cryptolepis buchananii, Petalidium barlerioides, Helicteres isora* and *Capparis zeylanica*. "We have seen initial success, but the research is still going on. The idea is to first reduce the competition by removing lantana by the 'cut root-stalk' method and then facilitate the growth of native grasses and trees," says Singh.

Once native plants outcompete lantana, they in turn create the environment for other native species to thrive, something that lantana does not allow. This helps recover the native plant and gradually animal biodiversity of the area and restores the whole ecosystem. DTE

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FAR FROM OVER

As the COVID-19 pandemic enters its fourth year, it appears to be turning endemic. The world recorded 56 per cent of the cumulative cases from the virus in 2022 alone, but the number of deaths due to the disease remained lower than previous years. Meanwhile, the year did not see any new strains of Omicron, a "variant of concern"

Analysis by **KIRAN PANDEY** and **RAJIT SENGUPTA**

Case for endemicity

Even as Asia, Europe, North America and Oceania saw their maximum caseload in 2022, the regions recorded low mortality, suggesting that a majority of the cases were mild in nature. Epidemiologists say the disease has become endemic in many regions, including several European countries and even India, and that these regions are unlikely to see a severe wave in the future

COVID-19 cases (in million)

	2020	2021	2022
Africa	2.76	6.98	2.69
Asia	19.90	64.28	111.71
Europe	23.92	65.17	152.45
North America	23.21	41.91	52.51
Oceania	0.05	0.54	12.67
South America	13.23	26.45	25.71

COVID-19 deaths

	2020	2021	2022
Africa	65,507	163,031	28,803
Asia	337,086	914,815	246,044
Europe	569,149	994,173	423,450
North America	508,701	706,598	320,624
Oceania	1,061	3,458	16,653
South America	413,261	765,948	133,481

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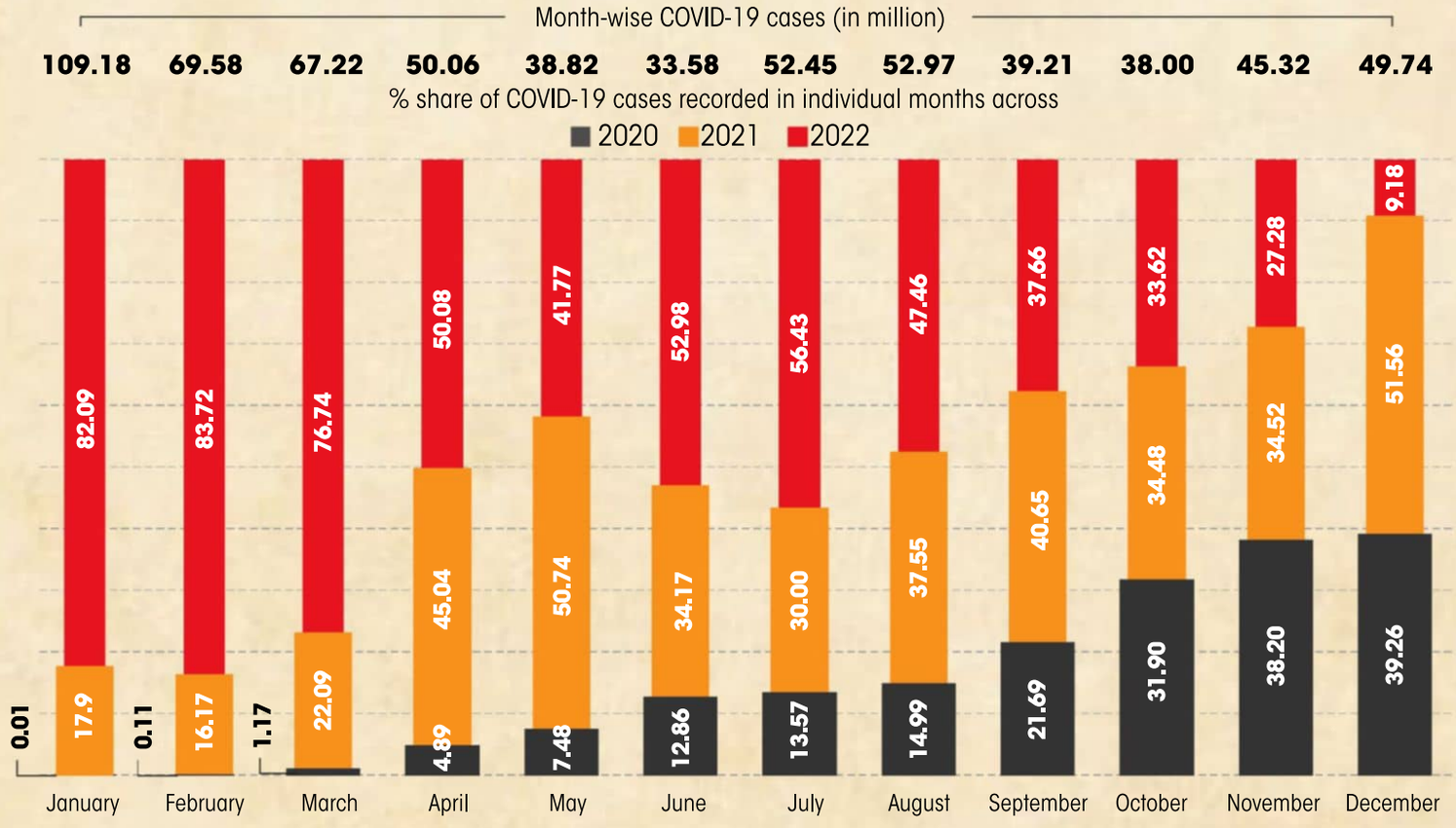
2022 saw the highest case burden...

In seven months of 2022, the world saw the highest number of cases since the start of the outbreak



A year to forget

In 2022, at least 107 countries saw their highest ever COVID-19 cases in a year since the outbreak began in 2020. The 2022 caseload in 86 of these countries was higher than the combined caseload for 2020 and 2021

- Countries that recorded their highest ever COVID-19 caseload in 2022
- Countries where the 2022 caseload was higher than the combined caseload for 2020 and 2021

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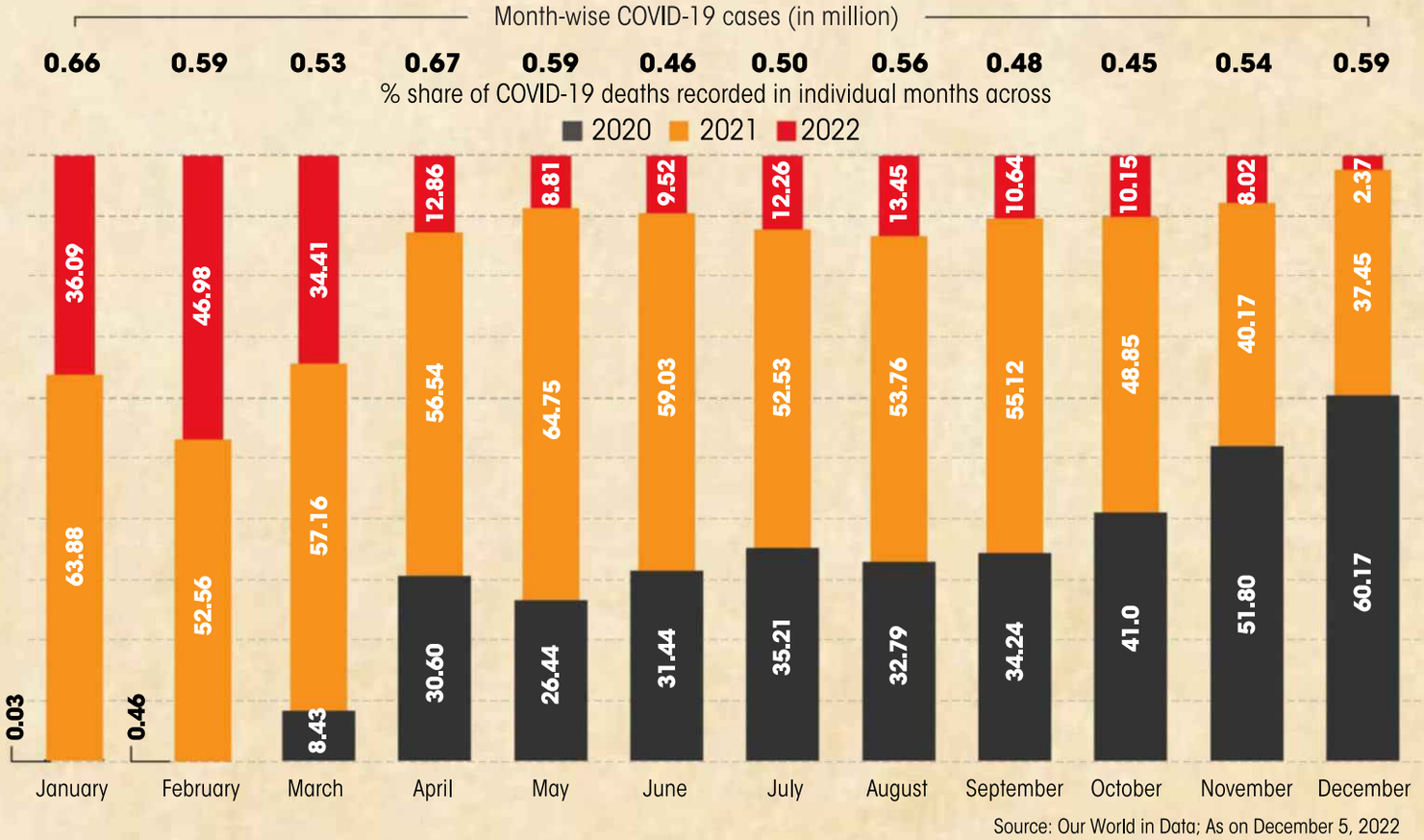
...but a lower death burden than previous years

The number of deaths has dropped significantly starting April 2022



Source: Our World in Data; As on December 5, 2022

Planting monopolies in farm sector

The EU free trade deal may force India to jettison farmers' traditional rights in favour of breeders' interests

IN THIS season of Christmas cheer, there is much to celebrate in the traditions that have come to be associated with the festival. And there is much for business to celebrate in the symbols and customs intrinsic to the festival. For instance, the poinsettia, a plant that has been associated with Christmas since the 16th century. Although it is now available in many hues, its traditional red and green foliage is widely used in Christmas floral decorations.

The shrub, known for its showy red bracts or modified leaves, is native to Mexico and was used by the Aztecs for dyeing their garments and as an anti-pyretic medicine. How the *cuetlaxochitl*, meaning "flower that grows in residues" in the Aztec language, became the Christmas Eve flower of modern times as well as a top-selling potted plant is a story replete with patents, a market monopoly and a leaked trade secret that finally undermined one American family's control of the business in the 1990s after a nearly 100-year run.

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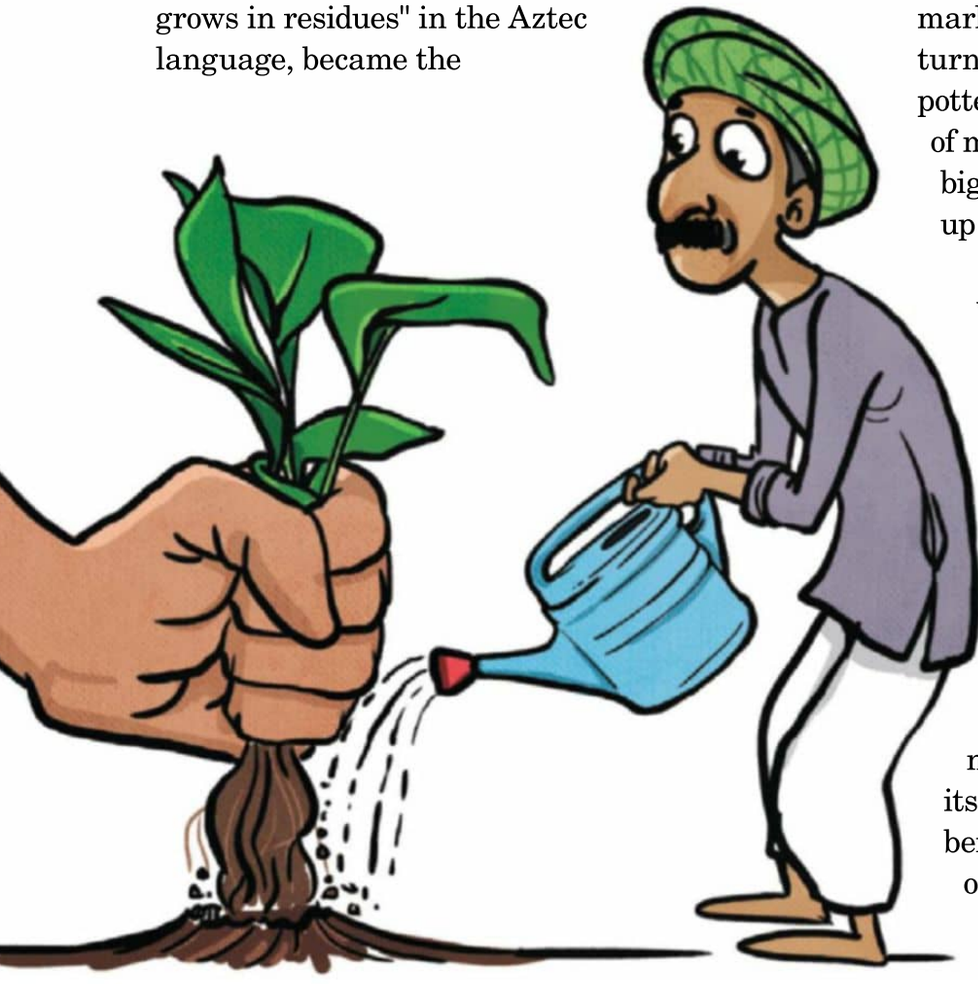

Brought to the US by the country's first ambassador to Mexico, Joel Poinsett, a botanist, the poinsettia was named after him. It caught the fancy of Albert Ecke, an émigré from Germany, who sold it on the streets of Los Angeles. His son and grandson promoted the attractive variations they developed through a grafting technique to create fuller, more compact plants than the weedy original. Their intensive marketing of a regular release of new varieties turned the poinsettia into the most popular potted plant in America, accounting for sales of more than US $250 million annually, a big chunk of it in the weeks leading up to Christmas.

The Ecke family, says a report on the website of the US Patent and Trademark Office, holds roughly 500 US plant patents, "a tribute to the ingenuity and passion of their vision, technological talent, and business acumen". Looked at from this angle, the poinsettia is a case study of what breeding skills combined with business acumen can achieve in a setting of intellectual property rights (IPRs). Or is it, rather, a case of biopiracy where the people and the region that nurtured the plant for centuries and inspired its link with Christmas did not share the benefits of its commercialisation? It all depends on the perspective one takes and whose interests one wants to nourish and protect: the breeder's or the cultivator's.

Cuetlaxochitl growers could not compete with the likes of the Ecke Ranch firm (the Ecke family's horticulture genetics company), and were unable to export to a lucrative market. Instead, they became growers for the American company.

True, in 1828 when Poinsett brought the shrub to the US and distributed it to his friends, there was no Convention on Biological Diversity (CBD) which decrees fair and equitable sharing of benefits arising from the use of genetic resources. In any case, the US is still the only major country that is not a party to CBD. On the other hand, the big boost to the US poinsettia industry came from the Plant Patent Act of 1930. More than 23,000 plant patents have been granted since then, and the US Patent and Trademark Office says "plant patents are an interesting and often overlooked part of the US IP system."

Apart from patent systems in individual countries, there have been systematic initiatives at the behest of plant breeders to create strong protection for their varieties—at the cost of farmers. The most significant of these is the International Union for the Protection of New Varieties of Plants (UPOV), a treaty created outside the UN to provide a regulatory system for protecting plants. Members joining UPOV have to enact a compatible national law. Since it was first passed in 1961 at the prodding of European breeding companies, the treaty has been revised thrice, the last being in 1991, when the most stringent regulations were added. So far, just 76 members have signed and many of these did so because of pressure when signing bilateral trade agreements with the EU, US, Japan and the European Free Trade Association. An example of this is New Zealand, which has just enacted a Plant Variety Rights Act to meet its obligations under the Comprehensive and Progressive Agreement for Trans-Pacific Partnership that it has joined. The new Act gives effect to the provisions of UPOV 1991, without New Zealand actually becoming a signatory to the convention. The country has tried to balance the rights of its Māori population to their traditional plants, but analysts have noted that breeders' rights have been given precedence.

Like many other countries, India has refused to join UPOV since it denies farmers any rights, such as the freedom to reuse farm-saved seeds and to exchange them with their neighbours, which is a tradition in this country of poor farmers. With the World Trade Organization's all-encompassing IPR agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS) coming into force, India had the choice of either joining UPOV or to formulate a *sui generis* system that granted protection to breeders' rights while keeping farmers' interests uppermost. The result was the Protection of Plant Varieties and Farmers Rights Act of 2001 (PPV&FRA), which balances the interests of both while encouraging innovation in new varieties. This, however, has not been to the liking of developed countries, and India has faced pressure constantly to join UPOV. The standoff with PepsiCo, which attempted to enforce its IPR on two of its registered potato varieties that are used to make its branded wafers, has not helped India's case that it was compliant with global norms on protecting breeders' rights.

India constantly faces pressure to join UPOV. The standoff with PepsiCo, which attempted to enforce IPR on two registered potato varieties, has not helped

MAGAZINE KING

In 2018, multinational PepsiCo began intimidating potato growers in Gujarat for violating its IPR, claiming that the farmers were using its variety illegally. It filed IPR infringement cases against a clutch of cultivators, the first such cases to be filed in India. Following massive protests by farmers and a strong campaign by farming activists, the authority overseeing the implementation of PPV&FRA was last year forced to revoke PepsiCo's registrations, which had another six years to go. This has opened India to further pressure, the latest from the EU, which is negotiating an ambitious Free Trade Agreement (FTA) with India. One of its demands, according to farmers' lobbies up in arms against the FTA, is the demand that India join UPOV.

A sustained mobilisation against the trade deal, the details of which are not public, is underway and there is no prospect of peace and goodwill on this contentious point. DTE @ljishnu

Palette

WHAT'S INSIDE

Lula faces daunting tasks on return as Brazil president **P48**

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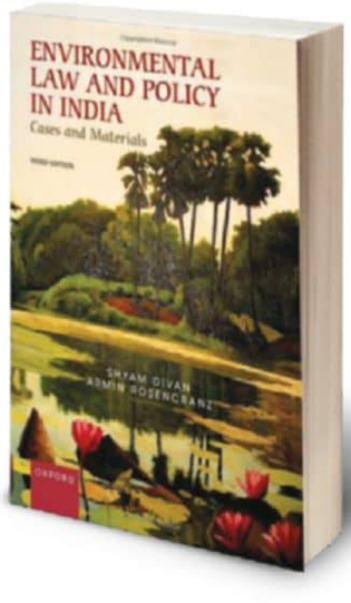
RECOMMENDATIONS

EXHIBITION

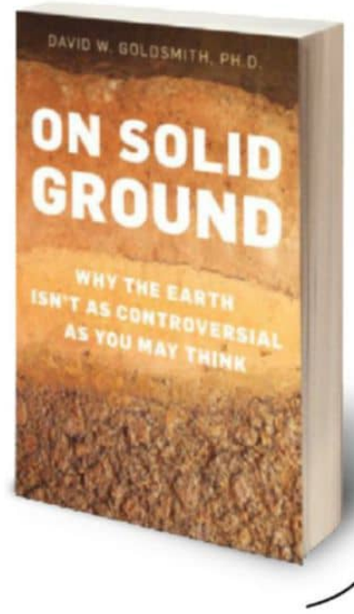
MAGAZINE KING

India is home to more than 50 unique folk art forms, such as Picchwai, Meenakari and Godna, many of which are thousands of years old and only shared from one generation to another within communities. As the years go by, appreciation of these traditional practices is fast disappearing. Why not, then, celebrate the start of the new year by lauding some of these traditional art works at "Endangered Folk Arts of India"? The exhibition and sale of traditional paintings will be hosted by Indian Folk Art Foundation, an Australian art organisation, at the DakshinaChitra Heritage Museum in Chennai on January 4-19. For details, visit *www.indianfolkart.org*

BOOKS



Environmental justice has transformed drastically over the years in India, with introduction of laws and policies to protect people, wildlife and the environment and establishment of the National Green Tribunal to ensure that these norms are upheld. In the third edition of *Environmental Law and Policy in India* (first printed in 1991), lawyers Shyam Divan and Armin Rosencranz present a comprehensive view of the legal developments, notable cases and judgements, and existing problems in the environmental justice system of the country.



For every fundamental scientific reality that we know about the Earth, there is at least one theory that contradicts the evidence, whether the debate be on the impacts of certain chemical compounds, protocols to determine the age of fossils or even the shape of the planet. US-based paleontologist and academic David Goldsmith attempts to set some facts straight with his book, *On Solid Ground: Why the Earth Isn't as Controversial as You May Think,* which explores some popular points of contention on the planet and what science says on them.

Battle half won

Lula's return as president speaks of his appeal with Brazil's poorest people. But this time the country is bitterly divided and short on cash

GUILHERME CASARÕES

LUIZ INÁCIO Lula da Silva's victory in Brazil's 2022 presidential race was nothing short of heroic. Despite being Brazil's most popular politician—and its most successful president in the past 50 years—he had to face two obstacles. The first was the persistent rejection of his Workers' Party in Brazilian politics since 2016. That is when former president Dilma Rousseff, Lula's ally, was ousted after a contentious impeachment trial on charges of corruption.

The second and more obvious obstacle was incumbent president Jair Bolsonaro, who has an unparalleled capacity to mobilise the masses. The fact that Bolsonaro garnered more than 58 million votes (against Lula's 60 million) was proof of his strong and cohesive far-right supporting base. In his re-election bid, Bolsonaro deployed every state resource to benefit his Liberal Party by lowering fuel prices, expanding access to the country's emergency cash transfer programme and allocating federal budget. There were also allegations of vote-buying and voter suppression on his behalf during the elections.

Yet, Lula cinched the election on October 30, 2022, by a razor-thin margin. There are three factors that may have contributed to his win. First, Lula's track record as president in the early 2000s plays a role. The successful combination of targeted social policies, rise in real wages and credit expansion during his tenures took more than 36 million Brazilians out of extreme poverty and put 32 million into the lower middle class. Bolsa Família, his flagship conditional cash transfer scheme introduced in 2003, is still considered a milestone in poverty reduction, both in Brazil and beyond. Despite a small budget, comprising 0.5 per cent of Brazil's GDP (gross domestic product), the scheme helped Lula and Rousseff administrations reduce poverty by 15 per cent, extreme poverty by 25 per cent and lower inequality by 10 per cent.

The scheme had significant impact across the least developed regions of the country, particularly in the North and Northeast, where child mortality rates dropped and the attendance rate of girls in schools increased consistently. That explains why most northern states have been the strongholds of the Workers' Party since the mid-2000s, and why Bolsonaro did not hesitate to abolish Bolsa Família in 2021, and replace it with an unregulated programme for emergency cash transfer.

Second, one cannot downplay Lula's charisma and his ability to reach the poor and marginalised populations. When the former metalworker and union leader founded the Workers' Party in 1980, he brought together grassroots movements from all over the country, namely labour unions that had grown in size and importance as Brazil became industrialised, ecclesial communities, and small and widespread Catholic groups that professed the pro-poor, socially oriented liberation theology across Latin America. Forty years later, Brazil's social reality has changed. Labour unions have given way to a precarious working class that lacks job security and is increasingly dependent on the state for basic

MAGAZINE KING

needs like healthcare and education. The Catholic church's social work is replaced with Pentecostal churches with individualistic and profit-driven gospel. But Lula has still been able to tap into people's hopes and dreams for a better future amid rising inflation and slow recovery from the novel coronavirus pandemic.

The third factor is Lula's unique ability to bring together forces from across the political spectrum. Rather than running a left-wing campaign centred on Workers' Party, Lula somehow managed to build an overarching front against Bolsonaro and in favour of a pluralistic form of democracy undermined by the Brazilian far-right in power.

His most consequential move was giving the vice-presidential ticket to his former opponent Geraldo Alckmin of the Brazilian Socialist Party. Since the elections were deeply polarised, Lula made this decisive move towards the centre, offering a moderate, pragmatic and conciliatory platform that attracted liberal economists, businesspeople and landowners. Most of them backed Lula and the Workers' Party for the first time.

MAGAZINE KING

LOT LEFT TO DO

Lula's electoral triumph is just the beginning. As the 39th president of Brazil (Lula's inauguration is scheduled for January 1, 2023), he will face two daunting challenges: rebuilding the country's political institutions, reintroducing policies that have been undermined by the Bolsonaro administration, and healing the wounds of a country sorely divided along class, regional and ideological lines.

The transition is the immediate concern. Even though Bolsonaro had authorised his ministers to kickstart the two-month-long shift to the new administration, neither he nor his military allies cooperated during this period. Moreover, since Lula's win, supporters of Bolsonaro, who believe elections were "stolen", protested across the country, blocking roads, stirring violence in the countryside and asking for military intervention.

Lula will also face challenges while forming his cabinet. His administration must reflect the mosaic of political forces that have supported his candidacy. At the same time, he would have to strike a balance between introduction of sound policies and urgent reforms, and his ability to build a majority coalition in a highly fragmented legislative branch without being hijacked by clientelistic politicians, patronage practices and corruption. Debates over flexibilising the spending cap legislation, which would allow increase in government spending for welfare and other programmes, have posed a major challenge for Lula's relationship with the Brazilian Congress.

Lula, although a seasoned and popular politician, needs to make difficult choices in times of scarce resources, growing recession and divided politics. He cannot fail to restore people's trust in the government for providing social policies and reducing inequality. If he wants to leave a long-standing legacy in his third (and possibly final) term, Lula must restore Bolsa Família and use it as a platform to make Brazil united and prosperous again. DTE

down2earthindia

(Guilherme Casarões is professor of public administration, political science and international relations at the Fundação Getulio Vargas School of Business Administration, São Paulo, Brazil)

IF LULA WANTS TO LEAVE A LONG-STANDING LEGACY IN HIS THIRD (AND POSSIBLY FINAL) TERM, HE MUST RESTORE BOLSA FAMÍLIA AND USE IT AS A PLATFORM TO MAKE BRAZIL UNITED AND PROSPEROUS AGAIN

Killed in cold blood

Surveys quantify the impact of crop intensification on frogs and reptiles; say loss of species and farm productivity inevitable

DEYATIMA GHOSH

THE DEMAND for land for food production always results in an uncomfortable trade-off between agricultural expansion and species conservation. One can see an example of this trade-off in paddy fields, whose unique combination of wet and drylands provide ideal habitats for amphibians and reptiles. These cold-blooded animals, together referred to as herpetofauna, provide immense ecological services. Frogs and toads, for instance, act as biological control agents by feeding on crop pests. Several salamanders and tadpoles of frogs help in controlling mosquito and mosquito-borne diseases by feeding on the larvae. They also help improve soil quality and aeration, aid in dispersal of seeds and in pollination—there are almost 40 species of lizards including skinks and geckos that are efficient pollinators. However, the diversity and abundance of these herpetofauna are rapidly declining with increased use of pesticides, fertilisers, land conversion, changes in cropping systems and the reduced proportion of natural vegetation. According to the International Union for Conservation of Nature (IUCN), 1,532 species of Anurans (frogs) and 825 species of reptiles in the world are critically endangered, endan-

MAGAZINE KING

gered and vulnerable due to agriculture and its management practices. They appear to be particularly threatened in India which has a high amphibian diversity—most of them are endemic to the region—and, as per the UN Food and Agriculture Organization, had the largest cropland area over the last decade, followed by the US and China.

To understand the impact of crop intensification on the populations and diversity of herpetofauna, researchers from the University of Calcutta conducted a year-long survey of farm lands in Odisha's Baleswar district, known as rice bowl of the state. Almost 90 per cent of the 250,550 hectares of cultivable land in the district is under paddy, according to data available on the district's official website.

Being cold-blooded, amphibians and reptiles have unique physiological demands. They are extremely sensitive to microclimates (with a narrow range of soil humidity, moisture, light flux, acidity, air and soil temperature) and microhabitats (they have small habitats like grass cover and low dispersal range; maximum lifetime dispersal for frogs and toads is 12 km). This makes them particularly susceptible to agricultural intensification. However, the researchers find a distinct difference in the way it affects amphibians and reptiles.

The abundance of amphibians was almost half and their diversity was low in areas with high cropping intensity, pesticide application and low natural vegetation when compared with areas where less-intensive farming is practised. This difference is because amphibians are more exposed to pesticide contamination than reptiles as their skin is highly permeable and performs both respiration and water uptake, the researchers say in a 2020 study published in the journal *Biotropica*. The consequences could be far reaching as waterbodies, which harbour amphibians at various stages of their life, can get contaminated by pesticides due to seepage and spillover from agricultural lands even if they are 1 km away. By comparison, reptiles only inhale and ingest the pesticide. Their home range is also larger compared to an amphibian.

ABUNDANCE OF AMPHIBIANS WAS ALMOST HALF AND THEIR DIVERSITY WAS LOW IN AREAS WITH HIGH CROPPING INTENSITY, PESTICIDE APPLICATION AND LOW NATURAL VEGETATION

But this does not mean all is well with reptiles. The researchers suggest the species are rather going through an "extinction debt" wherein there is a lag between the impact of agricultural intensification on them and their response to it. The real impact of the current intensification of agriculture on reptiles would be felt much later. When compared with amphibians, reptiles like snakes face a higher threat from conflicts with humans. Encroachment of forest areas and misconceptions and myths result in the indiscriminate killing of snakes irrespective of them being venomous or harmless.

DOMINO EFFECT

The researchers also find that in areas where the diversity of the frog population is lesser, the numbers of beneficial arthropods have reduced due to intraguild predation—a phenomenon where more than one species feed on the same prey and therefore competitors feed on each other. If this reduction in populations of both predators continues, it will disrupt the natural system of suppressing crop pest abundance, the researchers conclude in another study, which is yet to undergo peer review and currently available as a preprint in online repository *BioRxiv*. The study shows unless a threshold abundance of frogs is maintained, their impacts will be far from beneficial to agriculture.

Natural enemies of insect pests are responsible for an estimated 50-90 per cent of biological pest control in crop fields and economically this function has been estimated to be worth US $400 billion worldwide, according to a 2006 study by US researchers in the journal *Agriculture, Ecosystems & Environment*. The studies show that this can be facilitated by introducing diversity in habitats such as the presence of forested areas and hedgerows on the peripheries of fields, along with a reduction in monoculture or intensive crop cultivation.

Semi-natural and natural vegetation and buffer strips such as ditches, provide chances to increase numbers of alternate prey, intermediate hosts of target pests and increase the availability of nutritional plant resources. Semi-natural patches are beneficial for arthropod communities and can raise their numbers to enhance crop pest regulation. To optimise the benefits from existing farmland, the researchers recommend that biodiversity research be holistic so more organisms get targeted ecological services. down2earthindia

(Deyatima Ghosh is visiting researcher at University of Lincoln, UK and postdoctoral researcher at Ashoka Trust for Research in Ecology and the Environment, Bengaluru)

MAGAZINE KING

‘This rocket launch will inspire youngsters to join the space sector’

On November 18, 2022, Hyderabad-based Skyroot Aerospace Pvt Ltd scripted history by becoming the first private Indian organisation to launch a rocket from Indian Space Research Organisation’s (ISRO’s) launchpad in Sriharikota, Andhra Pradesh. The launch of the rocket, named Vikram-S after Indian space scientist Vikram Sarabhai, was successful. In a conversation with **ROHINI KRISHNAMURTHY,** Skyroot Aerospace co-founder **PAWAN KUMAR CHANDANA** talks about the company’s plans to establish itself as satellite launcher catering to the international market and the long-term goal of developing resuable rockets to ensure sustainabililty. Excerpts:

MAGAZINE KING

What are your plans with the launch of Vikram-S?

Launching the first private rocket into space is a significant milestone for any country. It is also a big symbol of what an Indian startup, and a small team like ours, can do. We are 200 people, of which 100 worked on Vikram-S directly and indirectly.

Vikram-S is sub-orbital. It reaches outer space and does not put satellites into orbit. Instead, it splashes down to the sea. It is just a 300-second flight. Our next launch is Vikram-1, which is an orbital vehicle. That means it puts satellites into orbit. We plan to launch Vikram-1 in a year. Very few companies in the world have launched a rocket into space; even fewer have launched satellites. We also have Vikram-2 and 3—orbital vehicles—in the pipeline. All of them are 80 per cent the same.

Do you target serving the international market? Do you see competing with SpaceX?

With Vikram-1, we have had bookings. We have two customers who have already signed up with us and will be flying on our maiden launch. There are a few slots left. We hope to close them in a few months. Vikram 1 has a capacity of up to 300 kg. We plan to use only 50 per cent of its capacity as payloads since it is our maiden orbital vehicle launch. Currently, over 90 per cent of the market is international for us. We are building the product mainly for them. We also want to be a significant player in the Indian ecosystem as it grows. In the future, every space launch has to compete with each other. So we will be competing with all space launch companies, including SpaceX.

How difficult has it been to secure funding? Does India have enough skillset to support private space sector?

Both talent and capital are our biggest challenges. We raised almost US $68 million, which is never seen in the Indian space sector before. Raising that kind of capital has been difficult because no private vehicle has been launched before. We had to meet many investors, convincing them and giving them faith that it is a very sustainable business.

As for talent, most of it is within the government. We have had very experienced retired ISRO scientists with us. That filled the talent gap. We have also hired freshers with the proper fundamentals and trained them in rocket technology in the first few months. We also hired talent from allied organisations or other industries such as aircraft or other aerospace industries. We believe this first rocket launch from India to space will inspire many youngsters to join the space sector. ISRO will not be the only avenue.

MAGAZINE KING

VIKRAM-S USED SOLID FUEL—AMMONIUM PERCHLORATE—BUT IT IS NOT A COMPLETELY GREEN FUEL. WITH VIKRAM-2 WE PLAN TO USE LIQUEFIED NATURAL GAS, WHICH IS GREEN COMPARED TO TRADITIONAL KEROSENE FUEL

You work closely with private firms. What collaborations have you forged?

We have partnered with multiple space start-ups, such as Bellatrix Aerospace, Dhruva Space Private Limited and Manastu Space. We are trying to partner with almost every company that wants to launch satellites into space. For example, Bellatrix Aerospace is building orbital transfer vehicles (OTV). Our job is to take any payload or satellite from Earth to space, and Bellatrix is working on in-space transportation, which is moving a satellite to the required destination. It is like a last-mile delivery within space. We will launch their OTV into space. And then, from there, they will put satellites in their best-end locations as last-mile delivery.

You have also partnered ISRO.

With ISRO, we have a different kind of partnership. We utilise their test facilities, launch facilities, and, whenever required, technical expertise. We built Vikram-S, but ISRO provided the launch pad and the range systems for tracking it.

Rocket launches come with a hefty carbon footprint.

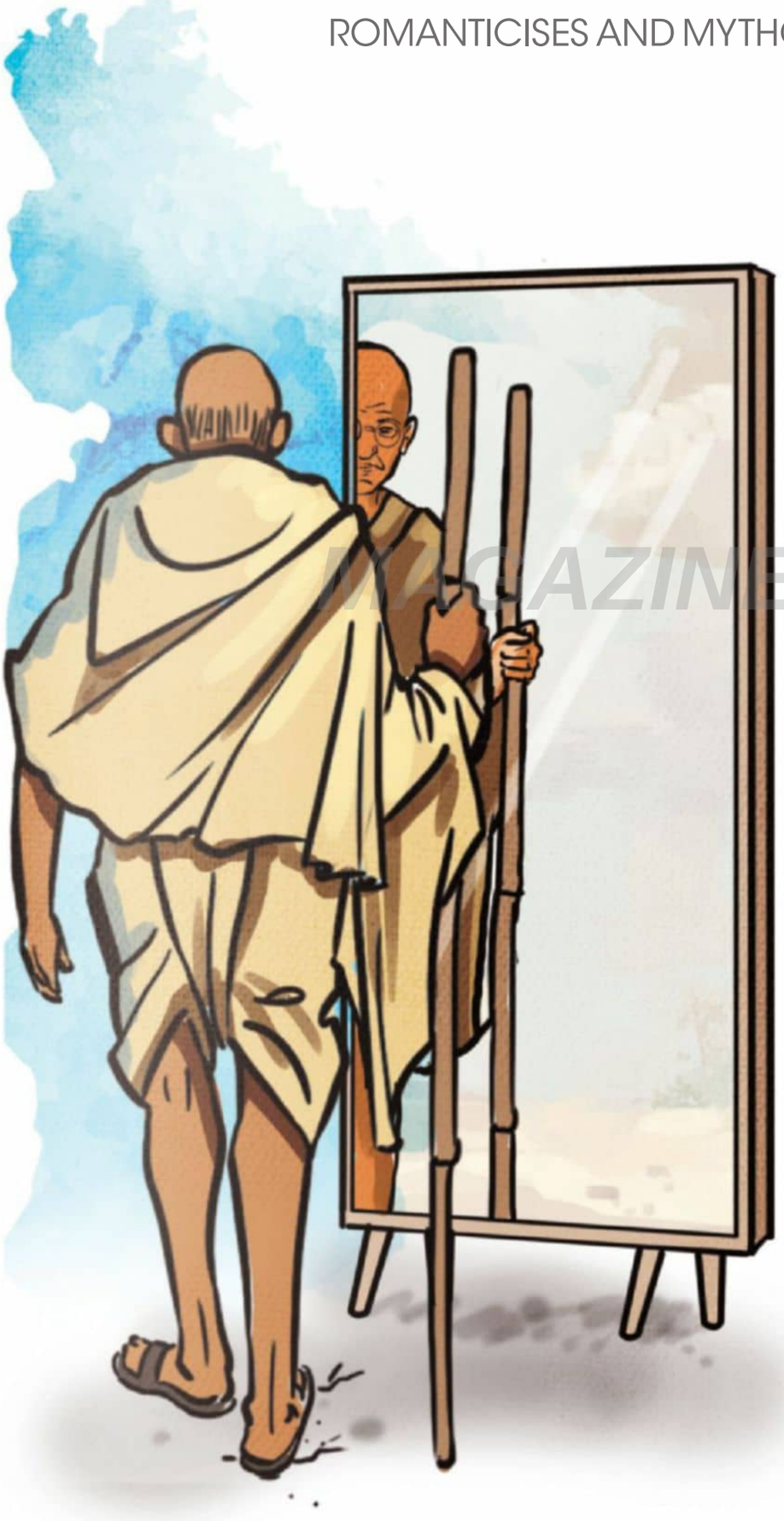
We understand that the fuel we use is not green. There are two ways of making it green. One is using a green propellant. Vikram-S used solid fuel—ammonium perchlorate—but it is not a completely green fuel. With Vikram-2 we plan to use liquefied natural gas (LNG), which is green compared to traditional kerosene fuel. We want to demonstrate the technology, build the capability, and slowly shift towards LNG propellant.

The other way to achieve sustainability is reusability. That means we do not throw away the rockets in the sea. Instead, we land them for reuse. We are a few years away from that, but we are taking a few initial steps. We wish to see that change happening in the next five years. DTE

Barely a contrast

WALKING FROM DANDI: IN SEARCH OF VIKAS IS YET ANOTHER HAGIOGRAPHY OF M K GANDHI THAT UNCRITICALLY ROMANTICISES AND MYTHOLOGISES THE HISTORICAL FIGURE

AKSHAT JAIN



MAGAZINE KING

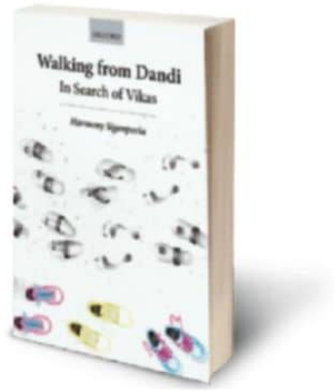
IN FEBRUARY 2019, Harmony Siganporia, associate professor at a business school in Ahmedabad, retraced in reverse the route M K Gandhi took during his Dandi March of 1930. During her walk from Dandi to Ahmedabad, Siganporia travelled roughly the same distance the march covered every day, tried to stop at the same places where the march halted, and talked to people to find out how the march is remembered and thought about today. *Walking from Dandi: In Search of Vikas* is her account of that journey. The book, however, has turned out to be yet another hagiography of Gandhi that romanticises and mythologises the historical figure.

Let me give an example. The author says, "Gandhi lived his life more keenly aware of context and the need to adapt to it than most." But she forgets to mention the dark side of this "adaptation". In Africa, the context was anti-black and so Gandhi took that stance, arguing it was necessary for the success of his fight for the rights of Indians nationals. In India, the context was pro-caste (or pro-*varna*, as Gandhi might say) and so Gandhi took that stance "in the greater interest" of the movement. Discussing the context in which the Dandi March took place, B R Ambedkar, in his book *What Congress and Gandhi Have Done to the Untouchables* (1945), says that while on the one hand Gandhi and his fellow "Congressmen were engaged in fighting for Swaraj which they said they wanted to win in the name and for the masses, on the other hand and in the very year they were committing the

worst outrages, upon the very masses by exhibiting them publicly as objects of contempt to be shunned and avoided."

On the face of it, the book contrasts Gandhi's vision of India with the country's current developmental vision. The author even goes so far as to claim that "The sort of structural oppression symbolized by the neo-bonded labour epidemic could not have come to pass under Gandhi's watch." Sure, but the book never stops to ask what would have come to pass under Gandhi's watch if not this? Had she asked this question, she would not have been able to escape the inevitable conclusion that what Gandhi wanted was Gram Swaraj or a return to those very villages that Ambedkar called "sinks of localism, dens of ignorance, narrowmindedness and communalism" and from which he bid his fellow untouchables to escape to the cities.

Another contrast the book uncritically employs is between Gandhi's imagination of Gujarat and the Rashtriya Swayamsevak Sangh's imagination of Gujarat. Instead of exploring, analysing and justifying this through empirical research or theoretical discussion, the book begins from the assumption that the contrast is obvious and does not need further examination. Instead of assuming that Gandhi's vision was different, maybe the book could have explored how Gandhi set up Gujarat in a way that it could so easily become, what she calls after Vishwa Hindu Parishad leader Praveen Togadia, a "laboratory of Hindutva". After all, according to her own admission, almost all of Gandhi's speeches during the Dandi March employed the rhetoric of *dharma* and holy war to rouse people against the British.



Walking from Dandi: In search of Vikas

by Harmony Siganporia

Publisher: Oxford University Press

MRP: ₹1,495 | **Pages:** 320

Late Bojja Tharakam, an Andhra Pradesh-based human rights activist, advocate and poet, in his book *Mahad: The March That's Launched Every Day* (2018), compared Gandhi's Dandi March and the attendant salt satyagraha with Ambedkar's Mahad March and the water satyagraha of 1927. While Gandhi broke laws because it was his *dharma* to reject laws that his inner voice of truth (How is former US President George Bush forming opinions based on his gut feeling any different?) found unjust, Ambedkar did the exact opposite and upheld laws precisely as a weapon to annihilate *dharma*. This is the real opposition to Gandhi, which Siganporia does not even hint towards. The "apposite opposite" of Dandi is not vikas but Mahad, and that of Gandhi is not Modi but Ambedkar. Gandhi pretends that it is possible to have a *dharmic* society without caste, but Ambedkar outright rejects the possibility.

While Gandhi's saintliness has been used in the book to justify Hinduism by relegating its excesses to Hindutva, which is called an aberration of "real" Hinduism, Ambedkarites clearly state that Hindutva is the political core of Hinduism and there is no difference between the two. That is why while Siganporia exclusively focuses on the need to reform bad Hindus, anti-caste activists demand unconditional annihilation of caste.

Throughout her book, Siganporia talks about the urgent need to normalise the sight of women in the public sphere but gives Gandhi a pass for not including women in his march, and that too for the inanest of reasons—Gandhi claimed he did not include women because he did not want to dissuade the British from using force against the marchers; as if the British did not use force against women and children. At the Jallianwala Bagh massacre in 1919, the British authorities opened fire on unarmed men, women and children.

Women were indeed included in the Mahad Satyagraha and upper caste Hindus still beat them up. Gandhi's logic of the British being too civil to beat up women and children makes upper caste Hindus appear worse than the British. And if that is the case, then what moral right did they have to conduct a satyagraha against the British?

Finally, Gandhi, the saint of Sabarmati, has sanctified rebellion with such impossible moral standards that actual rebellion seems impossible to justify. How can a Bhagat Singh or a Bhimrao Ambedkar or a Kanshi Ram possibly live up to the standards of rebellion made *de rigueur* by Gandhi? They can be dismissed as impure rebels since they do not have the extreme privilege required to wage a "pure" rebellion like Gandhi's. Sarojini Naidu famously quipped that it cost the nation a lot to keep Gandhi in poverty. We can also say that it costs the nation a lot to keep Gandhi in sanctity. DTE

MAGAZINE KING

SAVOUR THE TANG

Sour *heimang* is a versatile ingredient in Asian cuisines and packs a nutritional punch

VIBHA VARSHNEY

IN SEPTEMBER, bunches of creamy white flowers adorn the *heimang* trees (*Rhus chinensis*) that grow widely across Manipur and the other northeastern states. The flowers stand out against the green leaves of the deciduous tree, aptly earning them the nickname of "September beauty". And by November and December, they transform into deep red cherry-like fruits with glandular velvety hair which have been used for centuries as food and medicine.

The spherical fruit has a citrus-like tartness and, though tiny, it is packed with nutrients such as polyphenols, flavonoids and antioxidants. Traditional healers of Manipur, who are called the *maibas* or *maibis*, prescribe *heimang* for common gastro-intestinal problems like diarrhoea and dysentery. They recommend eating the water-soaked fruit for indigestion and stomach ulcer.

The healers say that the fruit is also useful in the treatment of kidney diseases and urinary stones. Researchers with the Council of Scientific and Industrial Research-Central Food Technological Research Institute in Mysuru and the Academy of Scientific and Innovative Research at Ghaziabad support this claim. Their study, conducted *in vitro* (experiments involving glassware, like test tubes), states that extracts of the *heimang* fruit inhibits the formation of calcium oxalate crystals (which make the most common type of kidney stones), and of experimentally induced urinary stones. The study was published in the *Journal of Herbal Medicine* in October 2021.

Other parts of the *heimang* tree such as its leaves (including the abnormal growths or galls on them), roots, stem and bark are also found to have preventive and therapeutic effects. Apart from diarrhoea and dysentery, compounds derived from these tissues can be used in the treatment of ailments such as rectal and intestinal cancer, *diabetes mellitus*, sepsis, oral diseases and inflammation, states a review published in journal *Phytotherapy Research* in December 2010. The plant has compounds that are good for the teeth as it prevents the enamel from losing minerals, researchers note in the review.

The 2010 review paper also finds that compounds isolated from the stem of the *heimang* tree can significantly suppress HIV-1 activity *in vitro*. HIV-1 is one of the two subtypes of the human immunodeficiency virus and is more widespread. An August 2018 a review of 37 research articles published in the *European Journal of Integrative Medicine* also notes this benefit. It suggests *heimang* extracts may suppress HIV-1 and herpes simplex virus activity, reduce post-meal increase of blood glucose, prevent high cholesterol

MAGAZINE KING

The citrus-like tartness of *heimang* fruits are used to flavour meats, vegetables and desserts. They are also used as a herbal tea

and protect the genetic material.

Local communities in the state also use *heimang* leaves to prepare a herbal shampoo called *chinghi* by boiling them with rice water. After cooling, the preparation is sieved using a muslin cloth and the clear liquid is used as shampoo. It can be stored for two to three days.

Researchers from the School of Food Science and Technology, Jiangnan University, China, have also tried to establish medicinal properties of the plant. They write in the March 2019 edition of journal *Industrial Crops and Products* that the oil produced from the fruit and seed has beneficial unsaturated fatty acids and phytochemicals and is a good ingredient to use in dietary food and nutrition supplements.

TRY IT SALTY OR SOUR

Manipur is part of one of the world's most biodiverse areas, the Indo-Burma region, which spans the northeastern India and parts of other Southeast Asian countries. Small wonder then, that *heimang* has a long history of culinary and medicinal use among communities in countries where the tree grows.

In China, *heimang* is called *yán fu mu*; *yán* means salt in Mandarin. In ancient China, certain communities used to add the fruit to food for its salty taste. It is still used by the Hani community that lives in the Naban River Watershed National Nature Reserve.

The sour taste of the fruit, attributed to the presence of organic acids such as malic acid, citric acid and ascorbic acid, makes its use versatile. It is used to flavour meats, vegetables and even desserts. Traditionally, it is mixed with jaggery to make a nutritious and digestive candy. It is also dried and powdered to be used as a flavouring. Some simply boil the fruit in water and consume the decoction as herbal tea (see recipes). To ensure year-round availability of the fruit for use in tea or as souring agents, fresh *heimang* fruits are dried and stored.

Despite its extraordinary versatility, *heimang* has not yet found widespread commercial use. Some companies in India have started including the fruit in herbal teabags. Promotion of such traditional products will provide livelihood opportunities for those communities that have access to the tree. DTE

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RECIPES

HEIMANG TEA

INGREDIENTS

Heimang fruits: 1 teaspoon
Tea leaves: 1/2 teaspoon
Water: Enough for 2 cups of tea
Sugar to taste

METHOD

Boil the water and add the tea leaves and *heimang* fruits. Sieve them out once the decoction is ready. You can also add ginger to the boiling water for enhanced taste and medicinal value, along with a pinch of salt. Add sugar as preferred and the tea is ready to be served.

HEIMANG CHURAN

INGREDIENTS

Heimang fruit: 100 g
Sugar: 10 g
Salt to taste

METHOD

Dry and powder the *heimang* fruits. Blitz the sugar as well. Mix the powders with salt and the digestive *churan* is ready to be eaten on its own or sprinkled over salads.

MAGAZINE KING

End of tenure

THE YEAR 2023 is the penultimate one for the incumbent National Democratic Alliance's (NDA's) second tenure. In May 2024, NDA, led by Prime Minister Narendra Modi, will face the general elections. As expected, one tends to evaluate what promises were made and what were delivered by the government that is entering its 10th year in power. This February, the government will present its last full Budget, where it is likely to bring out a white paper on its own performance.

To refresh our memories, 2022 was the deadline for many of the government's grand and even transformative promises from its first tenure (2014-2019). The grandest among them was Modi's personal promise to the people to deliver a "New India", to coincide with the 75th year of independence. To achieve this, the NITI Aayog announced the "Strategy for New India@75" in 2018. After abandoning the five-year plan mode, the strategy for India@75 remains the only codified vision for the country. The NITI Aayog strategy includes 41 promises ranging from becoming a US $4 trillion economy to doubling farmers' income and eradicating poverty; 2022 was the delivery date for at least 17 of these promises.

Still, during the 2022-2023 Budget speech, the Union finance minister Nirmala Sitharaman made no mention of "New India" and its goals. Instead, she said, "This Budget seeks to lay the foundation and give a blueprint to steer the economy over the Amrit Kaal of the next 25 years—from India at 75 to India at 100." The Union finance minister might have given "New India" a pass because, going by the indicators, the country has not met any of the targets. Even the prime minister appears to have given up on these promises and moved on to the idea of "Amrit Kaal", which is a vision without any measurable indicators and a deadline that is a quarter-century away.

So what should we expect from the Budget next month? Usually, the last Budget before the general elections is designed with electoral benefits in mind. But the context of this year's Budget is unprecedented. For the past three years, the country has been in the grip of the COVID-19 pandemic. The economy, which had started to slow down three years before the pandemic, is yet to regain the pre-pandemic level of growth. Unemployment continues to be around 8 per cent. The situation has become so frustrating for millions in the labour force that they have stopped looking for work. Agriculture, the last resort of sustenance, no longer pays for a decent survival. Add to it the rising inflation that ultimately devalues our earnings. A widespread recession is setting in that will further impact the Indian economy in near future.

Why do we buy metaphysical political agenda while deep in economic distress

In this context, the government has to bring out the next Budget and fight the election a year later.

The government has consistently covered the economic crisis with a narrative that India's economic growth is one of the "best" in the world, even if the comparison is between now and the pandemic years. This also means that the next elections will be more about metaphysical agendas than real development or the government's performance on its grand promises. This metaphysical agenda could be sensed when the "Amrit Kaal" was declared in the last Budget. As the narrative becomes more mythical we, as a country, enter a fairy world where each of us is told to assume an illusory sense of global power and feel good about it. To express this in a modern electoral system, we have to now press the button in the voting machine, just like ringing the bell in a temple, in approval. DTE @richiemaha

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